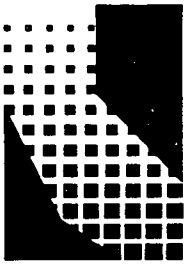

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SEWAGE SLUDGE DATABASE

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NOVEMBER 1993

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November 1993

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EXECUTIVE SUMMARY

The Sewage Sludge Study is designed to provide guidance to the California Integrated Waste Management Board (CIWMB) in three major areas related to the new Federal sludge regulations (40 CFR Part 503). The first area deals with the effect that the Federal regulations might have on disposal of sludge to landfills in California. Sludge disposal to landfills is not regulated by Part 503; therefore, if sludge reuse/disposal methods regulated by Part 503 become less feasible as a result of these Federal regulations, landfilling of sludge could become more attractive to some Publicly Owned Treatments Works (POTWs). To analyze whether there could be such an effect, the Sewage Sludge Study analyzes sludge samples and historical data provided by over 40 California POTWs. These data are compared with pollutant limits provided in the Part 503 for three main types of sludge reuse/disposal: land application, surface disposal, and incineration.

In the second area, the Sewage Sludge Study compiles data designed to verify whether the Federal sludge regulations, which were developed based on a study conducted by EPA of POTW sludges throughout the country in 1988, would be adequately protective of health and environmental factors in California. If California sludges contained pollutant levels outside the range considered by EPA when it developed the numerical pollutant limits, there could be some concern as to whether the Federal limits would be adequate to protect California. To answer this concern, the report compares levels of pollutants in California sludges with the pollutant data obtained in the National Sewage Sludge Survey, which served as the basis of the Part 503 regulations. Despite differences in the methods used in the two studies (EPA's national survey versus this Study) the data collected in this Study are very comparable with data collected during the national survey of 1988. Without exception, the pollutant averages were very similar between the two studies.

The third task of the Sewage Sludge Study is to evaluate existing California regulations to determine where additional authorities would be needed in the event that the State applied to assume sludge program responsibilities. EPA's intention is that states assume responsibility for sludge management, but they must be able to demonstrate to EPA that the required legal authorities are available to the state. The Sewage Sludge Study does not recommend whether the State should apply to EPA to manage the sludge program within California, nor does it make recommendations regarding how the State would implement such a program. However, the Sewage Sludge Study does identify where existing authorities are inadequate to meet EPA's requirements of sludge programs, and the types of decisions that the State will need to make in determining whether to apply for sludge program primacy.

The 503 standards for land application of sludge include risk-based limits for three different scenarios or options for sludge reuse. On average, the California sludges studied comply with the limits; however, some individual samples do not comply. Limits are provided for 10 metals. Of these, molybdenum and lead limits appear to present the greatest difficulty for California sludges to meet. However, EPA has not yet finalized its protocol for determining noncompliance of a sludge with the limits for a particular reuse/disposal option.

A total of 12 out of the 36 POTWs (33%) for which data were evaluated do not meet at least one of the standards in at least one sludge sample for the most stringent scenario (bulk application to home lawns or gardens - 503.13 Table 3). Thus, the Part 503 land application regulations may reduce sludge reuse options for a significant proportion of POTWs.

In addition, seven POTWs (19%) provided analyses indicating that their sludges would not meet the less stringent ceiling concentrations of 503.13 Table 1 for application of sludge in bulk or bag to any type of land. This limitation may significantly reduce the options these POTWs have for disposal of their sludges.

Although a significant proportion of the POTWs in the study would appear not to be able to meet the most stringent set of standards for surface disposal of sludge (503.23 Table 7), it is unlikely that this actually poses a problem for most POTWs. Only two POTWs in the study identified surface disposal as their current sludge option, and neither of their sludges has shown noncompliance with surface disposal standards. Two POTWs in the Study who are currently landfilling their sludges did not consistently meet surface disposal standards (503.23 Table 6) for units located further from property boundaries. Thus, some POTWs who may be considering other sludge management alternatives may find that surface disposal is not an option for them. However, none of the POTWs in the Study who stated in their questionnaire that they were investigating other methods of disposal indicated that surface disposal was among the options being considered.

The cutoff values for certain pollutants listed in Part 503 Preamble Table III-2 (Attachment 1) are exceeded in some samples documented in the DRYWTS database. These pollutants are copper for incineration; chromium for monofill over Class II or III groundwater; molybdenum for monofills; selenium for monofills and incineration; and zinc for monofills and incineration. Currently, no POTWs in this study who exceeded these cutoff values are practicing the sludge reuse/disposal methods associated with the cutoff values. However, it is possible that other California POTWs may have sludges which exceed EPA's cutoff values, and these POTWs may practice

the associated disposal methods. Since the cutoff values are not limits in the 503 regulations, the State may wish to further evaluate the pollutants which Part 503 does not regulate. For instance, California could restrict a sludge which exceeded a cutoff value for a given reuse/disposal option in Preamble Table III-2 from being disposed of by that particular option.

EPA is encouraging states to apply for sludge program delegation. California will need to make certain decisions regarding implementation of the sludge regulations. If the State seeks program delegation from EPA, State regulations will need to be enhanced to include all the requirements set by the Federal program. California will also have to decide which State agency or agencies will assume responsibility for program implementation.

Introduction

Background

Sewage sludge generation by municipal treatment plants has emerged as a major waste management problem in recent years. Nationwide, treatment plants have doubled their annual generation of sludge since the early 1970s to the present level of 7.7 million dry metric tons, and sludge production is projected to double again by the year 2000. In the 1987 Amendments to Section 405 of the Clean Water Act (CWA), Congress determined that standards for sludge use and disposal should be implemented through permits issued either by EPA or by states under an approved program. In 1989, EPA promulgated regulations for approval of state sludge management programs that are administered either through NPDES programs (40 CFR Part 123) or through non-NPDES programs (40 CFR Part 501). The requirements for either type of program are essentially the same. These regulations establish a legal and programmatic framework for a national sludge use and disposal program. Like the NPDES program, Congress intended the sludge management program to be implemented and enforced primarily at the State level. EPA encourages states to develop program submissions so they can be approved and take over implemention of the sludge programs.

If California decides to develop its own sludge management program, there are a number of decisions which the State must make. For instance, the State must accept EPA's technical standards, develop its own standards for sludge quality, or determine whether a combination of State and Federal standards is most applicable. If the State chooses to develop its own standards, it must be able to justify and support this decision to EPA in its sludge program submission. The State may not implement standards less stringent than EPA's. In addition, the State must evaluate whether its legal authorities are adequate to ensure compliance and implement requirements for state sludge programs, as contained in 40 CFR Parts 122, 123, 124, and 501.

Purpose and Scope of the Sewage Sludge Study

The Sewage Sludge Study was conceived by CIWMB staff to acquire and analyze information that would provide guidance to the State in three major areas related to the new Federal sludge regulations. First, CIWMB was interested in the effect of the Federal regulations from the standpoint of its role as the State agency that regulates disposal to landfills. Sludge disposal to landfills is not regulated by Part 503, so, if sludge reuse/disposal methods that are regulated by Part 503 become less feasible as a result of the new Federal regulations, landfilling of sludge could become more attractive to some POTWs. CIWMB desired to obtain information which would indicate whether this scenario was likely. For this purpose, SAIC analyzed sludge samples and historical data provided by over 40 California POTWs. These data were

compared with pollutant limits provided in the Part 503 for three main types of sludge reuse/disposal: land application, surface disposal, and incineration.

Second, CIWMB sought to verify whether the Federal sludge regulations, whose basis was a study conducted by EPA of POTW sludges throughout the country in 1988, would be adequately protective of health and environmental factors in California. Based on an earlier study performed for CIWMB by Booz-Allen, CIWMB accepted the risk assessment which was used in developing the Federal regulations. Therefore, the concern focused on whether California sludges could contain pollutant levels outside the range considered by EPA when it developed the numerical pollutant limits. To answer this question, SAIC compared levels of pollutants in California sludges with the pollutant data which served as the basis of the Part 503 regulations.

In the third major focus of the Sewage Sludge Study, CIWMB recognized that EPA's intention was for states to assume responsibility for sludge management, upon demonstrating to EPA that the required legal authorities were available to the state. Therefore, the Sewage Sludge Study evaluates existing State regulations to determine where additional authorities would need to be added in the event that the State applied to assume program responsibilities. Several State agencies currently have varying levels of authority for aspects of sludge management. SAIC was not charged with recommending a regulatory scheme to replace this existing structure, but merely to determine where the authorities lay and what additions, if any, would be necessary to conform with EPA's requirements. Therefore, in this report SAIC has not made recommendations regarding State implementation of the sludge regulations. Similarly, SAIC has not developed a recommendation as to whether the State should apply to EPA to manage the sludge program within California. However, this report does identify where existing authorities are inadequate to meet EPA's requirements of sludge programs, and the types of decisions the State will need to make in determining whether to apply for sludge program primacy.

Role of the Regulatory Advisory Committee

A Technical Advisory Committee (TAC) had previously been convened by CIWMB staff for advice regarding sludge management and reuse within California. CIWMB staff contacted the members of the TAC, or the agencies they represented, to determine their interest in continuing their role on a reformulated Regulatory Advisory Committee (RAC). Some of the members from the initial committee were available to serve on the current committee. Committee members were chosen by CIWMB to represent the various State agencies which have involvement in sludge management or which offer technical expertise in related areas. EPA was also invited to send a representative. The purpose of the RAC is to provide technical advice and guidance on sludge issues, from the viewpoints of the agencies represented by the membership. RAC members and affiliations are as follows:

SEWAGE SLUDGE REGULATORY ADVISORY COMMITTEE

NAME	ASSOCIATION
Steve Austrheim-Smith	CIWMB
Scott McFarland	CIWMB
Bill Orr	CIWMB
Mike Schott	CIWMB
Steve DeMello	CIWMB
Ron Duff	SWRCB
Jim Cornelius	SWRCB
Archie Matthews	SWRCB
Gordon Innes	SWRCB
Lisa Babcock	SWRCB
Teng Wu	SFB RWQCB
Kenneth Landau	CV-RWQCB
Jean Rabovsky	OEHHA
Bill Vance	OEHHA
Greg Harris	ARB
Janette Brooks	ARB
Lisa Kasper	ARB
Matthew Reeve	CDFA - Fertilizer/Livestock
Lauren Fondahl	EPA

In addition, at the third meeting of the RAC when SAIC presented the preliminary results of the Sewage Sludge Study, Roberta Larson of the California Association of Sanitation Agencies (CASA) attended.

The RAC was convened three times during the course of the Study. At each meeting, the RAC made specific decisions and provided certain types of guidance for the Study. SAIC used the guidance provided by the RAC in conducting this Study. Other guidance was received directly from CIWMB project staff. Throughout this report, the decisions made by the RAC and the guidance provided will be identified. Otherwise, SAIC used its professional expertise and knowledge, and discussions with CIWMB project staff to conduct the Study.

The purposes and results of each RAC meeting are briefly summarized below:

Meeting No. 1: The RAC identified which POTWs would be included in the study. Forty-two POTWs were initially identified to be included by RAC members. The RAC discussed appropriate sampling and analytical methods for obtaining initial data from these POTWs.

The RAC reviewed the pollutants and limits in Title 22 CCR, Division 4.5, Chapter 11 and the proposed Federal parameters found at 40 CFR Part 503, and discussed priorities for the pollutants to be included in the Study.

Meeting No. 2: The RAC reviewed the partial database of sludge information available for the previously selected POTWs and recommended additional sampling for certain pollutants. Based on SAIC's suggestion, the RAC and CIWMB project staff agreed that it would be appropriate to sample each of the POTWs in the study for all Part 503 pollutants (11 metals). The RAC provided guidance on the appropriate detection limits for the sample analysis. SAIC presented a comparison of existing State sludge management regulations with the new Federal sludge regulation and asked for comments from the RAC.

Meeting No. 3: Jean Rabovsky of OEHHA briefed the RAC on risks associated with molybdenum, and other health issues associated with Part 503 pollutants. At the time of the meeting, OEHHA was unable to obtain a copy of the complete risk assessment performed in the development of the 503 regulations. SAIC presented the results of the data analysis and comparison of California sludges to national sludge data and to the Federal sludge pollutant limits. The RAC deliberated on whether the Part 503 limits developed by the U.S. EPA are appropriate for California, and whether the Federal standards can be adopted without modification. The RAC and CIWMB project staff concluded that pollutant limits more stringent than the Federal regulations did not appear to be justified at this time, based on the pollutant content of California sludges.

Technical Approach to the Sewage Sludge Study

The Sewage Sludge Study compiles data and compares the results of California sludge analyses to data utilized in the development of the Federal sludge regulations, and to information contained in the Preamble to the final Part 503 regulations. The Study's results are compared to the standards set forth for the various reuse/disposal options in Part 503. The Study evaluates the ability of California sludges to meet the Federal standards, based on the data and samples received from the POTWs included in the Study. A draft of the Study's results was presented to the Regulatory Advisory Committee during the May 4, 1993 meeting, and comments were solicited.

Finally, the Study identifies the additions to existing State regulations which will be necessary if the State applies for the sludge program. SAIC performed a section by section review of the Federal Part 503 sludge regulations, and compared them to existing California regulations for consistency. SAIC identified inconsistencies between the State and Federal regulations, and developed a detailed analysis and discussion of the implications of each inconsistent area. This analysis has been previously presented to CIWMB and the RAC in the Task 2 draft report submitted on February 2, 1993, and comments were solicited.

Methodology for Data Collection and Analysis

Identification of Pollutants

The original Part 503 proposal of February 6, 1989 identified 27 pollutants for which limits were proposed in at least one of several disposal/reuse categories. These pollutants included metals, chlorinated hydrocarbons, PCBs, and several other organic compounds. The disposal/reuse categories identified in this original proposal consisted of land application, distribution and marketing, sludge monofill, surface disposal, and incineration.

Due to extensive comments received from the public and proposed regulated communities on the original February 1989 proposal, and the results of the National Sewage Sludge Survey becoming available, EPA revised its original Part 503 proposal. On November 24, 1992, the revised Part 503 regulations were published in the Federal Register.

The significant differences between the 1989 proposal and the November 1992 final version are several. The 1992 revision reduces the number of regulated pollutants to a total of 11 (all metals), for all disposal/reuse options. The 11 regulated metals are as follows: arsenic, beryllium, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium and zinc. No new pollutants were added during the 1992 revision. The sludge disposal/reuse options covered by the final regulations are reduced to three by incorporation, as follows: 1) distribution and marketing are included with land application; 2) the separate category for monofills has been included with surface disposal; and 3) incineration. The limits for the 11 pollutants vary with the disposal/reuse options, and not all pollutants are limited for each option. In some cases the numerical limits in the final regulations were changed from the original 1989 proposal.

The first meeting of the Regulatory Advisory Committee, conducted on November 24, 1992, was intended to provide guidance to the Study in selecting the pollutants of concern. During this meeting, RAC members generally indicated that the focus should

be on the pollutants which EPA had identified to be present in sewage sludges and for which EPA's risk analyses had indicated that limits would be appropriate. Some RAC members felt, however, that data to be collected should include additional pollutants. The Air Resources Board members submitted a list of over 100 mostly organic chemicals for which it suggested data should be collected. SAIC and CIWMB project staff reviewed sludge analyses to confirm that these compounds are generally not present in sludges at the parts per billion level. Data collected would have consisted almost exclusively of "less than detection limit;" therefore, SAIC, with CIWMB staff concurrence, decided not to include these compounds in this Study. The OEHHA members suggested that data be collected for two organic compounds (bis (2-ethylhexyl) phthalate and benzene). Since these two compounds are sometimes found in sewage sludge (at parts per billion levels), SAIC collected historical data available from the POTWs for these two pollutants. However, due to the very high cost of organics analyses, CIWMB staff decided not to analyze sludges for these pollutants as part of this Study. Upon publication of the final rule by EPA, the focus of the Study became the 11 metals for which the Federal regulation set limits.

Selection of POTWs

During the first RAC meeting, SAIC presented information to the Committee to enable it to identify POTWs to include in the study. The POTWs were selected from a compilation of two California databases which identified all the permitted POTWs located within the State. The data presented during this meeting included the same types of data collected by EPA in its development of the basis for the Federal sludge regulations:

- Percentage of industrial flow to the treatment plant;
- Total influent/effluent flow rate;
- Type(s) of sludge disposed (whether primary or secondary or both);
- Types of sludge treatment processes utilized by the POTW;
- End product (digested sludge, sludge ash, or other);
- Disposal or reuse option;
- Existence of a pretreatment program for industrial wastewater control;
- Amount of annual sludge sampling required by each facility's permit.

SAIC sorted the database based on the following factors and groupings in order to facilitate the RAC's selection process. This enabled the RAC to evaluate and select facilities representative of a variety of service areas, POTW sizes, and sludge types.

Factor 1. POTW average daily flow rate categories:

- Flow is less than or equal to 1 mgd
- Flow is more than 1 mgd but less than or equal to 10 mgd
- Flow is more than 10 mgd but less than or equal to 100 mgd
- Flow is greater than 100 mgd.

Factor 2. POTW sewage sludge use and disposal practice groups:

- Land application (includes agricultural and nonagricultural, marketing and distribution - beneficial reuse)
- Surface disposal (sludge monofills, surface disposal without beneficial reuse)
- Incineration
- Landfilling (codisposal with municipal solid waste).

Due to the large number of POTWs included in this list (over 900), not every data type could be collected for each POTW in the time available. In addition to the nine POTWs the RAC selected during the meeting, the RAC decided to ask each Regional Water Quality Control Board (or RWQCB) for suggestions on POTWs to include in the Study. CIWMB staff and/or SAIC contacted each RWQCB and obtained a total list of 42 facilities. Although this number was higher than the 35 POTWs anticipated to be in the Study, the higher number allowed some leeway as there were concerns that not all POTWs would be willing to participate. The list of POTWs identified in this manner by the RAC and the RWQCBs is provided in Attachment 2.

Collection of Existing Data

SAIC developed a questionnaire designed to collect information from the POTWs in the Sewage Sludge Study. This information includes NPDES number, facility name, numbers of categorical and significant industries, influent flow rate, sludge disposal options and amounts, name of contract laboratory, description of sludge train, types of other wastes received by the treatment plant, and whether the sludge disposal option is expected to change. SAIC sent the questionnaire with an introductory letter from CIWMB to each of the 42 POTWs and followed up with at least one phone call to each POTW. In most cases, SAIC contacted the POTW representative several times, first to verify that the person receiving the questionnaire could provide the answers, then, once the questionnaire had been returned, to clarify information provided. This proved to be necessary due to the variation in definitions of terms used to describe sludge reuse/disposal options, and other such items.

The second purpose of the phone calls was to encourage the POTWs to send the results of historical analyses performed on their sludges, dating back to 1989, if available.

To enhance consistency and the ability of POTWs to comply with sludge regulations, State agencies should consider standardizing the definitions of sludge reuse and disposal to be identical to those contained in the Federal regulations.

SAIC input questionnaire information for the 42 POTWs into a computer database. This database, referred to as FACILITY, is described further in another section of this report. Significant fields of the FACILITY database are provided in Appendices 8 through 12, by sludge disposal option. Analytical data for sludges were input into a separate computer database, referred to as ANALYZE1, which also is described further elsewhere. A printout of relevant fields from this database is provided in Appendix 1.

Sludge Sampling and Sample Handling Protocol

SAIC recognized that consistent sludge sampling and sample handling by the POTWs selected to provide samples for analysis were essential to ensure data comparability. Therefore, SAIC developed and sent the following guidelines to each of the POTWs who agreed to collect samples for analysis as part of this Study. This protocol was developed based in large part on procedures detailed in EPA's *POTW Sludge Sampling and Analysis Guidance Document*, August 1989. Chain-of-custody forms were provided along with sample containers from CKY Incorporated, the laboratory which performed all analyses during this study. However, some POTWs preferred to use their own chain-of-custody forms.

Guidance for Sample Collection and Handling

Samples collected must be representative of the entire sludge unit or batch being monitored. The usual NPDES or WDR (waste discharge requirements) sample point for sludge will be an adequate location for the sludge samples required for this study. The samples should be collected from the treatment process immediately preceding the sludge disposal or beneficial use. The sample should represent solid and liquid portions equal to the sludge source. All samples should be collected at a point where the sewage sludge is well mixed. When available, samples should be collected at a sample tap. When a sample tap is used, the sample line must be purged prior to sample collection. The following points should be observed:

- The samples collected should consist of four or more grab samples which are then combined as a single composite sample for analysis.
- If adequate mixing conditions are present, a single sample is sufficient.
- If the mixing is not adequate, then several grab samples should be collected over an extended period of time.
- A chain-of-custody form (provided by the laboratory) should be filled out for each sample.
- All samples should be cooled to 4°C when collected and maintained at that temperature until analyzed.

Sludge with a high solids content, from a drying bed, a sludge stockpile, or a compost operation, should have grab samples collected from various locations in the bed or pile. A drying bed should be portioned into quadrants with a sample collected from the center of each. Drying bed samples should be collected as a core which extends from the sludge surface to the sand, including a small portion of sand. If possible, stockpile sludge or stockpile incinerator ash should also be sampled as a core. Four of more cores should be collected from various locations along the pile. If a core sample is not possible, the samples should be collected at various representative points and levels in the pile. These grab samples should then be mixed, and a composite sample should be collected from the mixture.

Sludge with a high solids content from a vacuum filter, a centrifuge or a belt filter press should have grab samples collected from the conveyor system. These samples should be sampled at equal time and volume intervals which represent the overall filter cake. Sludge from a plate or frame press should be sampled from quadrant center points in the bin. If liquid has accumulated in the bin, the samples collected should include a representative portion of the liquid. The grab samples should then be mixed together and a composite sample collected from the mixture.

Sludge with a low solids content, which is flowing from a process, such as an anaerobic digester or chemical conditioning, can typically be sampled at equal time and volume intervals. If the sludge being withdrawn has highly variable characteristics, then additional grab samples should be collected. Samples from a basin or lagoon should be collected from different levels and various representative locations in the basin or lagoon. There are several types of sampling equipment which allow the collection of a sample from a specified basin depth. Equal volumes of sample should be collected as grabs. These samples should then be refrigerated or iced (cool to 4°C) and combined as a composite.

Samples from a sludge with a high solids content (over 10%) should be collected with a stainless steel scoop and placed in a stainless steel bucket. Samples for metals analyses may be collected with a plastic scoop and placed in a plastic container. The sample should then be well mixed and an aliquot placed in a sample bottle. Samples from a sludge with a low solids content should be collected into a stainless steel, glass, or plastic container, depending on the parameter to be monitored. This liquid sludge should be well mixed and a composite sample poured up.

Samples collected for inorganic metals analysis (e.g., arsenic, beryllium, cadmium, total chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc) should be collected into a plastic container, and then the sludge should be placed in a plastic or glass sample bottle. Samples collected for organic analysis (e.g., benzene, bis (2-ethylhexyl) phthalate) should be collected directly into a glass sample container with a teflon-lined cap. The bottle should be filled to the top to assure no air space remains. The sample should be poured carefully to avoid the entrainment of air. Organic samples should not be collected or placed into plastic containers.

The laboratory which will perform the analyses (CKY Incorporated) will provide the appropriate sampling containers and will specify the necessary sample volume required. A sample volume of 1000 ml is adequate for most samples.

All sample containers provided by the laboratory will contain appropriate preservatives as required. In most cases, sludge samples with a high solids content (i.e., solid, semisolid) are usually not preserved in the field. However, all samples should be cooled to 4°C when collected and maintained at that temperature until analyzed. Do not allow the samples to freeze. If the sample is to be transported, it should be packed in ice. For some POTWs, the laboratory will be able to pick up the collected samples directly. The laboratory will provide shipping containers for those POTWs outside its service areas.

Labels will be provided by the laboratory. However, if a POTW prefers, the POTW's label can be utilized. The sample bottles should be tagged with the following information: name of individual collecting sample; sample identity; sample number; date and time of sample collection; volume; analysis required; and preservation. A chain-of-custody form (also provided by the laboratory) should be filled out for each sample. A field log should be maintained which illustrates and describes where each sample was collected. The log should also contain a record of the information given on the sample tag.

The following table is taken from 40 CFR Part 136. This table provides sample container, preservation and holding time information.

PARAMETERS	CONTAINER	PRESERVATION	MAXIMUM HOLDING TIME
Mercury	P,G	HNO_3 to pH <2	28 days
Other Metals	P,G	HNO_3 to pH <2	6 months

P= Plastic
G= Glass

Verification of POTW Sampling

SAIC sent a letter to each selected POTW requesting their cooperation in collecting samples of their sludge to have analyzed during this Study. SAIC conducted follow-up phone calls to all POTWs selected for sampling. The calls were designed to accomplish the following objectives:

- To verify that the POTW had received the letter requesting that they sample and the accompanying sampling protocol for the study;
- To determine whether the POTW would be able to continue to participate in the study by conducting the requested sampling;
- To discuss with the contact person who would actually be performing the sampling where the appropriate sample point is located at each facility;
- To ensure that the samplers understood the sample collection and handling requirements. The POTW contacts were encouraged to call SAIC back if they came up against any questions while performing the sampling.

SAIC discussed the sample collection protocol with each POTW contact to verify that they understood the needs of the Study. In these discussions, SAIC emphasized the need to collect samples at the point just before final reuse/disposal. Some POTWs routinely sample their sludge at several points; SAIC verified that samples collected for the Study would be obtained from the process closest to the actual disposal point for the sludge. For instance, Santa Rosa has historical data for both digested sludge and belt press cake. The appropriate sample point for this POTW is the belt press cake which is disposed to a landfill, rather than the digested sludge.

During the follow-up phone calls, three POTWs identified that there were unusual constraints on their ability to perform the requested sampling. The city of Anderson, Napa Sanitation District, and Dublin/San Ramon Sanitation District stated that their sludges remain in lagoons which are cleaned out occasionally or as needed. These POTWs typically obtain samples of the sludge as it is removed from the lagoons. SAIC determined that pulling samples from the lagoons would not necessarily be representative of sludge that was going to disposal, and thus would not fit the study requirements. Therefore, sludge samples were not requested from these POTWs.

Each POTW was asked to collect two samples about seven to ten days apart. Orange County requested and was provided with four sets of containers, so they could sample their two treatment plants separately. In order to have all samples analyzed and the data compiled by the final RAC meeting, each POTW was asked to have its samples collected by March 22, 1993. This cutoff date for sample collection was designed to aid in timely analysis and collection of the data.

After all sample results had been received from the laboratory, and the data were presented to the Regulatory Advisory Committee in a partial draft report during Meeting No. 3, SAIC mailed a copy of the laboratory report to each POTW who provided samples for analysis. SAIC received some phone calls from POTWs seeking clarification on various aspects of the reports. SAIC asked each of these POTWs how these results compared to other sludge analyses they may have conducted in the past. The POTWs indicated that the results substantially agreed with other analyses of their sludges.

Chino Basin Municipal Water District sent a letter providing the results of a split sample of the sludge which they had analyzed. Chino Basin was concerned that the detection limits obtained by the CKY laboratory for arsenic and selenium were too high to "detect the lower concentration limits of EPA's clean sludge." Because the samples are analyzed in wet weight concentration units which must then be converted to dry weights based on the percent solids of the sludge sample, it is not possible to determine in advance the detection limit that would be adequate for every sample. In addition, Chino Basin pointed out that CKY's analyses for molybdenum were 19 and <18 mg/L, whereas Chino's split samples indicated 16.8 and 16.3 mg/L, respectively. These differences are not significant and are well within acceptable analytical variability. However, this example illustrates that EPA's decisions on how to interpret noncompliance may be crucial to some POTWs. In the case of Chino Basin's samples, their results indicate compliance with the standard of 18 mg/L, but analysis of a split of the same sample can provide a result which is slightly over the allowable limit.

Analytical Protocol

Each sludge or sludge cake sample was analyzed by CKY Incorporated for the following 11 pollutants: Arsenic, beryllium, cadmium, chromium, copper, lead, molybdenum, nickel, selenium, zinc and mercury. Metals were extracted by EPA Method 3050. All metals other than mercury were analyzed using EPA Method 6010 (ICP). Mercury was analyzed using EPA Method 7470/7471 (graphite furnace). These methods were selected as providing detection limits below the pollutant limits provided in Part 503. Lower detection limits can be achieved through use of methods for atomic absorption analysis (AA) of metals. However, AA methods are more expensive than ICP analyses, and the added cost would have meant that fewer samples could be analyzed.

Sample containers, instructions, labels, and chain-of-custody forms were provided by the laboratory. All analytical results were to be provided to SAIC within 10 working days of sample receipt. All sample handling and analyses were to be in accordance

with EPA recommended procedures. QA/QC was conducted as part of the analysis protocol, and documentation was provided with the results of the analyses. Completed chain-of-custody forms were also provided.

Results and Conclusions of the Sewage Sludge Data Evaluation

Description of the Databases

Three databases were developed to receive the data generated during this study. The first database, referred to as ANALYZE1, contains the results of sludge analyses, both historical and those conducted as part of this study. This database includes the facility name (a keyword), date of sample, units of sample, type (wet or dry weight), and the actual values for each of 13 pollutants (benzene, DEHP, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, and zinc). The ANALYZE1 database manages the raw information as it is recorded from laboratory data sheets or annual POTW reports.

The sludge data collected during this Study can form the basis for a new database in which California can collect the large amount of sludge reporting that is required under the Part 503 regulations. Collection of these data will aid the State in making informed, supportable decisions regarding sludge reuse and disposal in California.

A printout of the metals values contained in ANALYZE1 is presented in Appendix 1. ANALYZE1 contains 402 sample records. A subset of the ANALYZE1 database that includes only the results of the samples collected and analyzed as part of this study is presented in Appendix 2.

In order to compare the data collected during this Study to the Part 503 pollutant limits, it was necessary to convert all wet weight data to dry weight data. This was accomplished by dividing the wet weight concentration of the pollutant by the percent solids (as a decimal). After conversion to dry weights, all dry weight data were placed into a second database, referred to as DRYWTS. The data in DRYWTS include not only converted data, but also data from ANALYZE1 which were already in dry weight units. DRYWTS contains 318 sample records. DRYWTS is a smaller database than ANALYZE1 because it was not possible to determine the initial status of some

samples (whether they were in dry weight or wet weight units). Also, percent solids was not available for all samples in ANALYZE1; without an estimate of percent solids, dry weight cannot be determined. Samples whose status was unclear were not included in DRYWTS.

A printout of the metals values contained in DRYWTS is presented in Appendix 3. Statistical summaries of the data in DRYWTS were performed. The results of these summaries are presented in Appendix 4. The summaries include a count of the number of above detection limit analyses for each metal, the average of those analyses, minimum, and maximum values. The summaries were performed for all data in DRYWTS, and for various subsets of the data, including CIWMB samples alone, and eight POTW data subsets for those POTWs having the largest number of sludge analyses (San Diego, Sacramento Regional, Chino Basin, EBMUD, Encina, Napa, and Orange County).

Further statistical summaries were performed on subsets of DRYWTS which correspond to the "flow rate groups" of the National Sewage Sludge Survey (NSSS), which is discussed below. These summaries are presented in Appendix 5 for three flow rate groups: 1 to 10 MGD; 10 - 100 MGD; and greater than 100 MGD. The NSSS included one additional group, those POTWs discharging less than 1 MGD, but insufficient data were available from 1 MGD facilities in the CIWMB study.

Appendix 6 contains a listing of the data for the organic pollutants benzene and bis(2-ethylhexyl) phthalate (DEHP), for which historical data were collected during this study. These data are also contained in the ANALYZE1 database. Appendix 7 includes the summary statistics for benzene and DEHP.

The third database, referred to as FACILITY, is designed to organize the information received from the survey of the POTWs. This information includes NPDES number, facility name, numbers of categorical and significant industries, influent flow rate, sludge disposal options and amounts, name of contract laboratory, description of sludge train, types of other wastes received by the treatment plant, and whether the sludge disposal option is expected to change. Information for 42 facilities is contained in the FACILITY database.

Fact sheets for each of the POTWs represented in the FACILITY database have been prepared as printouts of the database information. These are organized in the appendices by sludge reuse/disposal type. Each set of fact sheets is introduced by a summary page which lists the POTWs utilizing the sludge reuse/disposal option, the total number of categorical and significant industrial users served by these POTWs, and the total influent flow. The summary page also provides a breakdown of the percentage of the overall total that these factors represent. Land application and

composting are presented in Appendix 8; landfilling in Appendix 9; surface disposal in Appendix 10; incineration in Appendix 11; and other methods, such as stockpiling and disposal to another treatment plant are in Appendix 12.

Comparison of Study Results to National Sewage Sludge Survey

Introduction

The National Sewage Sludge Survey (NSSS) was conducted to obtain reliable analytical data to characterize the quality of final process sewage sludge. This data collection effort by EPA commenced in August 1988 and was completed in September 1989. The NSSS results ultimately formed the basis of the sludge regulations promulgated by EPA in Part 503 of 40 CFR.

Specifically, the NSSS data were used to develop national estimates for the probability distribution of pollutant concentrations in sewage sludge. These estimates were used in developing the regulatory impact analysis (RIA) and the aggregate risk analysis (ARA) for the final Part 503 rule. The RIA and the ARA project the benefits and expected effects associated with the final Part 503 rule. The results of the NSSS were also used to predict potential shifts in sludge reuse/disposal methods that would result from promulgation of the final regulations. Based on this assessment, EPA determined how much time was reasonable and necessary for POTWs to be able to comply with the regulations. The NSSS data will also be utilized in determining which pollutants need to be considered in a second round of rule-making.

As part of the NSSS, EPA sampled the final sludge product from a randomly selected set of 180 POTWs. The samples were analyzed for 419 pollutants. In addition, a 50-page survey was sent to 479 POTWs across the country. Completed survey forms were received from 462 POTWs. The purpose of the survey was to collect information on service area, operations, sewage sludge use and disposal practices, sludge testing frequencies, and finances. The POTWs were also asked to indicate which disposal practices would be likely alternatives to their current practices.

Differences Between NSSS and the CIWMB Study

CIWMB's Sewage Sludge Study was designed to follow the general design of the NSSS. The purpose of this approach was to generate data which could then be compared to NSSS data, and thereby provide some indication of the applicability of the basis of the Part 503 regulations to California sludges. Besides the fact that the CIWMB study included only California POTWs, the following differences between the two studies are noted:

1) The selection of POTWs was accomplished differently. The POTWs to be included in the NSSS were selected from a national list of POTWs obtained from the 1986 "Needs Survey." The Needs Survey classified POTWs based on sludge disposal method and POTW influent flow. The NSSS randomly selected POTWs from several broad categories of these two criteria. The selection of POTWs for the CIWMB survey was accomplished with the intent of obtaining a cross-section representing POTWs in all geographic areas of the State. Influent flow and sludge disposal method were included as criteria in this selection process to ensure representation of POTW variety in these areas.

2) The CIWMB study does not attempt to exclude primary or advanced primary treatment plants as did the NSSS. Also, the NSSS did not sample sludge lagoons and, thus, had no data from this type of process. In the CIWMB study, some historical data were available from lagoons, and these data are included in the database.

3) The NSSS relied entirely on samples collected by EPA at each of 180 POTWs. Historical data on sludge pollutants collected by the POTWs were not used. At the time, much less historical data would have been available, and the collection and analytical methods for those data may not have been state of the art. Therefore, EPA decided that for the purposes of the NSSS database, only samples collected by EPA would be used. In the four years since the NSSS was conducted, sampling and analytical methods have become much more standardized, particularly within California, and many POTWs have valid data on sludge pollutants. Most POTWs have analyzed their sludge at least once based on California's TTLC analytical protocols. Therefore, the CIWMB study includes data from 1989 through early 1993.

4) As a result of the manner in which data were collected for the NSSS database, each POTW from which samples were obtained was represented by one sample. In contrast, use of historical data in the CIWMB study results in some POTWs having more analyses included in the database than other POTWs have.

5) The NSSS estimated pollutant concentration statistics from "multicensored" data using a "maximum likelihood technique." This technique allows the incorporation of data points that were not measured above the detection level. In contrast, below detection limit data in the CIWMB database were not utilized to calculate pollutant averages or other statistics. The technique used in the NSSS to deal with this type of data would have questionable applicability to data obtained from the multiple sources of the CIWMB study.

6) The NSSS derived national estimates for all POTWs based on its surveys and sampling of the selected POTWs. These estimates were accomplished partly by using data from the 1986 Needs Survey of all POTWs in the country. The data obtained in the CIWMB study, in contrast, pertain only to the California POTWs actually surveyed, and have not been manipulated to derive estimates for nonsurveyed POTWs.

7) Classification of sludge management practices of CIWMB study POTWs is based on the 503 regulations, which include three types of sludge reuse/disposal methods: land application, surface disposal, and incineration. The NSSS used somewhat different definitions of sludge disposal practices, however, not all of which are regulated under Part 503. "Land application" and "distributing and marketing" are grouped together as "land application" in the 503 regulations. Codisposal landfilling, ocean disposal, and coincineration are not regulated under 503. A significant difference is that the NSSS included sludge lagoons under "surface disposal," whereas the 503 regulations consider lagoons a form of sludge treatment; treatment is not regulated under 503.

Comparison of the Study Populations

The following comparison of the classifications of POTWs in the two studies is presented to provide an indication of the similarity of the study populations. The difference between the NSSS and the CIWMB study described in #7 above should be recognized when evaluating this information. Flow rates are in million gallons per day (MGD).

Estimated Percentage of POTWs by Flow Rate Group and Disposal Practice - NSSS

Flow Rate Group	Disposal Practice				
	Land App	Incinerate	Surface Disp	Landfill	*Total
>100	2	31	4	4	81
10 - 100	25	15	31	19	91
1 - 10	57	5	9	28	99
<1	29	1	37	13	81

* Totals do not sum to 100% because disposal practices not performed by California POTWs in the study and not regulated under Part 503 (ocean disposal, co-incineration) are not included.

The study population of the CIWMB Sewage Sludge Study is described below. The category of land application includes distribution and marketing and composting. Surface disposal does not include sludge lagoons; instead, the final disposition of sludge from sludge lagoons is one of the four practices indicated below.

Percentage of POTWs by Flow Rate Group and Disposal Practice - CIWMB Study

Flow Rate Group	Disposal Practice: Land App	Incinerate	Surface Disp	Landfill	*Total
>100	50	0	25	0	75
10 - 100	42	17	0	25	84
1 - 10	48	4.3	4.3	35	92
<1	33	0	0	33	66

* Totals do not sum to 100% because in addition to the POTWs profiled in the categories above, five CIWMB study POTWs are stockpiling their sludge, and one sends it to another treatment plant.

Although for the most part the correspondence between the two studies in terms of the percentage of the sludge reuse/disposal option utilized is not close, it is unlikely that this affects the ability to compare the pollutant data obtained from these studies. At the time of the NSSS study, there were limited restrictions on sludge reuse/disposal based on pollutant levels; therefore, most POTWs would not have based their sludge management method on the quantity of sludge pollutants. Other factors, such as availability of land for application and composting, and economics would most likely have been determining. Therefore, differences in the study populations' disposal methods is not considered to be a variable in evaluating the pollutant quantities found in the two studies.

Comparison of the NSSS and CIWMB Study Results

The NSSS pollutant analysis results are presented by flow rate group. A summary value (referred to as "national pollutant concentration") is also derived for each pollutant on a flow-weighted basis. SAIC compared the NSSS data to the data average found in this Study and found a close correspondence between the pollutant averages when broken out by flow rate group. The differences between the studies that were discussed above appeared to have little effect on the comparison. Without exception, the pollutant averages were very similar between the two studies.

Comparison of Study Results to Part 503 Preamble Table III-2

As EPA's process of developing sludge limits progressed, decisions were made at various points to either include or exclude each pollutant that was initially under consideration. Based on factors including concentration, toxicity, persistence in the environment, and others, EPA scored each pollutant and ranked them for more rigorous analysis. EPA excluded two categories of pollutants from further consideration. First, pollutants were excluded if they presented no risk to human health or the environment at the highest concentration they occurred in the "40 City Study," a less comprehensive study that was conducted prior to the NSSS. Second, EPA deferred consideration of pollutants for which human health criteria or other data were lacking.

The Preamble to the final Part 503 regulations identifies several pollutants for which EPA did not conduct further analyses, and did not impose a limit for specific sludge reuse/disposal methods. The reasoning behind not limiting these pollutants was that the pollutant did not exceed an EPA human health or environmental criterion at the highest concentrations found in the "40 City Study."

Because EPA deferred further analyses of the pollutants in Preamble Table III-2, an evaluation of the need to limit these pollutants if they occurred at levels higher than the cutoff levels used by EPA was not performed. Therefore, there is uncertainty as to whether adequate protection of human health and the environment would be provided when sludges being disposed in the stated manner have higher levels of these pollutants. EPA used exposure assessment models to determine that these pollutants, at the concentrations indicated, do not interfere with the use or disposal of sewage sludge.

The following lists identify the POTWs and concentrations of the pollutants which are listed in Preamble Table III-2 and which were also included in the Sewage Sludge Study. However, as noted below, none of the POTWs with sample results over EPA's cutoff values is currently practicing the method of sludge reuse/disposal to which the cutoff value applies. Therefore, there is not at this time a concern, for the POTWs evaluated in the Sewage Sludge Study, that certain pollutants are not sufficiently regulated under Part 503.

Copper

At a concentration less than 1,427 mg/kg, copper is not limited for incineration. The following samples had levels equal to or greater than 1,427 mg/kg. None of the three POTWs having copper concentrations above the cutoff level practices incineration.

POTW	COPPER
Orange County	1600
Orange County	1590
Orange County	1430
Orange County	1450
Orange County	1490
Orange County	1440
Orange County	1740
Orange County	2110
Santa Rosa	1428
Santa Rosa	2269
Santa Rosa	1500
Santa Rosa	1714
Santa Rosa	1849
West Sacramento	1538

Chromium

At a concentration less than 1,499.7 mg/kg, chromium is not limited for a monofill over Class II or III groundwater. The following samples had levels equal to or greater than 1,499.7 mg/kg. The POTW having chromium concentrations above the cutoff level does not dispose of its sludge to a monofill, but rather to a municipal landfill.

POTW	CHROMIUM
Napa	2344
Napa	1689
Napa	2642

Molybdenum

At a concentration less than 40 mg/kg, molybdenum is not limited for monofills. The following samples had levels equal to or greater than 40 mg/kg. The POTWs having molybdenum concentrations above the cutoff level do not dispose of sludge to monofills, but to municipal landfills or composting instead.

POTW	MOLYBDENUM
Chino Basin	46
Napa	66.7
Orange County	50
Santa Rosa	48.6

Selenium

At a concentration less than 4.85 mg/kg, selenium is not limited for monofills and incineration. The following samples had levels equal to or greater than 4.85 mg/kg. The POTWs having selenium concentrations above the cutoff level do not dispose of sludge to monofills or by incineration, but to municipal landfills or composting instead.

POTW	SELENIUM
Chino Basin	7.3
Chino Basin	9.0
Chino Basin	6.8
Chino Basin	6.8
Encina	7.9
Encina	12.6
Encina	5.1
Encina	14.1
Napa	8.9
Napa	7.4
Orange County	6.9
Orange County	6.4
Orange County	4.9
Orange County	6.3
Orange County	4.9
Orange County	6.8
Orange County	5.0
Orange County	5.6
Orange County	8.4
Orange County	7.7
Orange County	5.3
Orange County	37.0
Orange County	48.0
Orange County	15.0
Orange County	5.9

POTW	SELENIUM
Orange County	7.4
Orange County	7.7
Redding	13.0
Sacramento Regional	6.5
Santa Rosa	11.8
West Sacramento	6.6
West Sacramento	6.2
West Sacramento	5.8
West Sacramento	6.9
West Sacramento	5.4
West Sacramento	6.5

Zinc

At a concentration less than 4,580 mg/kg, zinc is not limited for monofills and incineration. Only West Sacramento had a zinc value (4,769 mg/kg) greater than the cutoff. West Sacramento does not dispose of sludge to monofills or by incineration, but rather to a municipal landfill.

Comparison of Study Results to Part 503 Regulations

The dry weight averages for each of the 11 pollutants regulated by Part 503 were compared to the standards for land application and surface disposal. Because the Part 503 standards are based on dry weights, all data utilized and referred to in the following discussion are in units of mg/kg dry weight, unless otherwise indicated.

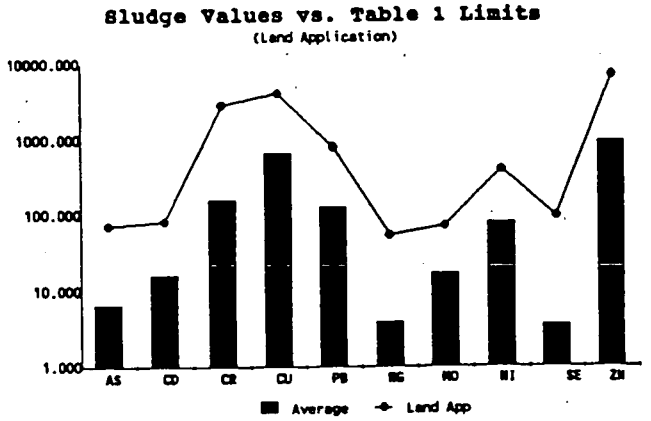
The State has interests both in ensuring that sludges do not impact human health or the environment, and that maximum flexibility for reuse of sludges can be maintained under State and Federal regulations. In order to ensure that both these interests are met, the State should offer advice on its perspective to EPA as Region 9 moves towards finalizing its protocol for determining sludge compliance with Part 503 limits.

The Federal regulations provide that if any of the regulated pollutants for a given disposal/reuse option exceeds the standard, the sludge cannot be managed through that option. However, EPA has not yet finalized its protocol for determining whether a sludge is considered to be in compliance with the limits for a particular reuse/disposal option. For instance, a single exceedance of a limit may not be considered significant to prevent the POTW from using that reuse/disposal option if additional sampling does not indicate continuing violations.

Land Application

Part 503 provides several sets of standards for land application of sludge. Ten metals are included in each set of standards. An absolute "ceiling concentration" is set for all types of land application of sewage sludge {503.13(b)(1)}. Bulk sewage sludge or sewage sludge sold or given away in a bag or other container cannot be applied to the land if the concentration of any pollutant in the sewage sludge exceeds the ceiling concentration for that pollutant. These standards are stated in Table 1 of 503.13(b)(1):

In the following graph, the vertical bars represent the average dry weight concentration found in the study data. The line above the bars represents the limits specified in Table 1. The scale of the Y-axis has been converted to a logarithmic scale in order to show all of the pollutants on one graph.



Part 503.13(b)(1) Table 1 - Ceiling Concentrations

Pollutant	Ceiling Concentration mg/kg
Arsenic	75
Cadmium	85
Chromium	3000
Copper	4300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
Selenium	100
Zinc	7500

Based on the averages of the sludges in the study, California sludge disposal options are not restricted by the ceiling concentrations set in the Federal regulations. Individual samples (both historical data and analyses conducted for this study) never exceeded the ceiling concentration standards for chromium, copper, molybdenum, nickel, selenium, and zinc. For arsenic and cadmium, one sample each exceeded the respective limits (from West Sacramento, Chino Basin). For lead and mercury, three samples each exceeded the respective limits (from Dunsmuir, Taft, Napa, Redding-CC, Fresno). The very low rates of noncompliance indicate that the majority of POTWs are able to meet the ceiling concentration standards for land application. Of the total of five POTWs which had noncomplying samples, three are currently landfilling their sludge, one is stockpiling, and the other is composting.

About 80% of POTWs in the Study were able to meet EPA's ceiling concentration limits in all samples, for all pollutants. Only seven out of the 36 POTWs for which data were available in the Study had levels of a pollutant which exceeded these limits.

A second set of more stringent standards was promulgated to control the application of sludge to land under the following three scenarios:

1) Part 503.13(a)(2) provides that bulk sewage sludge applied to agricultural land, forest, a public contact site, or a reclamation site must either meet standards for cumulative pollutant loading rates, or must not exceed the monthly average concentration limits found in Table 3 {503.13(b)(3)}.

2) Bulk sewage sludge applied to a lawn or a home garden must not exceed the monthly average limits in Table 3.

3) If sewage sludge is sold or given away in a bag or other container for application to the land, it must either not exceed the monthly average concentration limit for any pollutant in Table 3, or it must meet certain annual pollutant loading rates.

Scenarios 1 and 3 provide for alternative standards which are based on cumulative or annual loading rates to the area receiving the sludge. Because the alternative standards are expressed in milligrams per hectare, it is not possible to directly compare the Study data to these standards. POTWs applying sludge to land will need to evaluate their sludges individually to determine whether they can continue to apply their sludges to the same surface area.

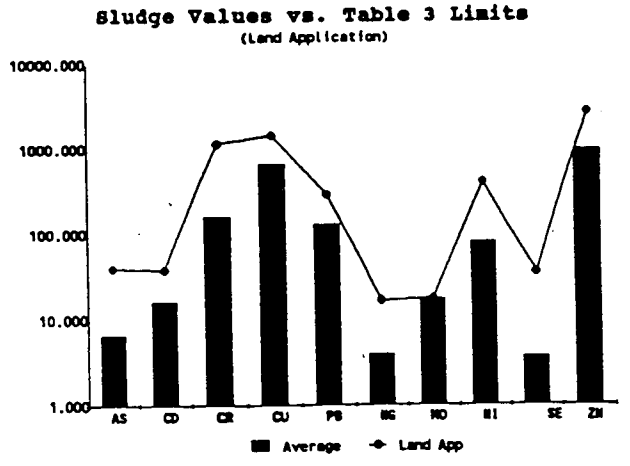
Sludges which do not meet concentration-based limits for land application should be evaluated for their ability to meet alternate standards based on cumulative or annual loading rates to the area receiving the sludge.

The 503.13(b)(3) Table 3 limits are as follows:

Part 503.13(b)(3) Table 3 - Pollutant Concentrations

Pollutant	Monthly Average Concentration mg/kg
Arsenic	41
Cadmium	39
Chromium	1200
Copper	1500
Lead	300
Mercury	17
Molybdenum	18
Nickel	420
Selenium	36
Zinc	2800

The sludge values found in the CIWMB Sewage Sludge Study were compared with the monthly average concentration limits found in 503.13(b)(3) Table 3. The following graph contrasts the average sludge values with the Table 3 limits for each of 10 regulated metals. The scale of the Y-axis has been converted to a logarithmic scale in order to show all of the pollutants on one graph.



On the positive side, the average sludge values found in this study do not exceed the monthly average concentrations for land application. However, the average molybdenum concentration (17.5 mg/kg) is very close to the limit for molybdenum (18 mg/kg). Seven POTWs and 18 samples exceed the molybdenum standard.

Although the molybdenum standard was exceeded the greatest number of times, several sludges exceeded the other standards, as described in the table below. Note that the data in this table include both historical data obtained from the POTWs and the results of sludge analyses conducted for this study.

Sludge Exceedances of 503.13 Table 3 Standards

Pollutant	Monthly Average Limit mg/kg	No. (%) Samples Exceeding Limit	No. (%) POTWs Represented
Arsenic	41	1 (0.3)	1 (3)
Cadmium	39	9 (2.8)	4 (11)
Chromium	1200	3 (0.9)	1 (3)
Copper	1500	8 (2.5)	3 (8)
Lead	300	10 (3.1)	6 (17)
Mercury	17	5 (1.6)	2 (6)
Molybdenum	18	18 (5.7)	7 (19)
Nickel	420	0 -	0 -
Selenium	36	2 (0.6)	1 (3)
Zinc	2800	10 (3.1)	3 (8)

POTWs: Chino Basin, Dunsmuir, Encina, Fresno, Napa, Orange County, Redding-CC, Santa Barbara, Santa Rosa, Taft, West Contra Costa, and West Sacramento.

Besides molybdenum, the lead limit was exceeded by the largest percentage of POTWs, with 17% of the 36 POTWs in the Study not meeting this standard at least once (including historical data). These POTWs could be restricted in their ability to reuse their sludge by any of the three scenarios controlled by the Table 3 standards.

POTWs practicing either scenario 1 or 3 described above will be able to evaluate their sludges against a second set of standards if they are unable to meet the 503.13 Table 3 standards. Thus, these POTWs may find that they are able to continue current sludge reuse practices. However, POTWs practicing the second scenario subject to 503.13 Table 3 standards, that is, applying bulk sewage sludge to a lawn or a home garden, do not have an optional second set of standards to evaluate their sludges against. Thus, Table 3 is absolutely limiting for this method of sludge reuse.

Surface Disposal

The Federal sludge regulations promulgate separate standards for surface disposal of sludge, in Subpart C. The standards apply to final disposal in a unit not having a liner and leachate collection system. The standards do not apply to storage or treatment of sludge on land. In addition, the standards do not apply to codisposal of sludge with wastes in a municipal landfill. Only three pollutants are regulated under the surface disposal standards, but varying levels of these pollutants are permitted depending on the distance of the disposal unit to the boundary of the property.

Part 503.23(a)(1) Table 6 - Pollutant Concentrations - Active Sewage Sludge Unit Without a Liner and Leachate Collection

Pollutant	Concentration mg/kg
Arsenic	73
Chromium	600
Nickel	420

Part 503.23(a)(1) Table 6 provides limits for arsenic, chromium, and nickel. These limits apply to sewage sludge units located more than 150 meters from the property line. All limits are expressed in dry weight units.

As stated above, no values in the Sewage Sludge Study database, either historical or obtained from samples collected in this study, exceed the nickel limit of 420 mg/kg in 503.23 Table 6. Three samples (1% of total chromium samples) from one POTW (Napa) (3% of 32 POTWs for which data were available) exceed the chromium limit, and one analysis (0.6%), from West Sacramento, exceeds the arsenic limit. Both POTWs are currently landfilling their sludges. The high rates of compliance with 503.23 Table 6 limits in general among the Study population indicates that sludge management within California is unlikely to be significantly affected by these limits.

Additional sets of limits have been promulgated in 503.23(a)(2)(ii) Table 7 for disposal units which are located less than 150 meters from the property boundary. These limits range down to the most stringent which are applied to units located within 0 to less than 25 meters from the boundary. The limits for arsenic, chromium, and nickel for this range are 30, 200, and 210 mg/kg respectively. A number of sludge samples exceeded these limits:

Sludge Exceedances of 503.23 Table 7 Standards
(Lowest values in Table 7)

Pollutant	Limit mg/kg	No. (%) Samples Exceeding Limit	No. (%) POTWs Represented
Arsenic	30	2 (0.6)	2 (6)
Chromium	200	69 (22)	8 (22)
Nickel	210	12 (3.8)	2 (6)

POTWs: Thousand Oaks, West Sacramento, Chino Basin, EBMUD, Fresno, Napa, Orange County, San Diego, and Santa Barbara.

Thus, 28% (10) of the POTWs in the study would not be able to meet the most stringent set of standards for surface disposal of sludge. However, it is unlikely that this actually poses a problem for most POTWs; only two POTWs in the study identified surface disposal as their current sludge option. Neither of their sludges have shown noncompliance with these standards. Also, if a sludge exceeds the more stringent Table 7 standards for surface disposal, the POTW could opt to locate its sludge disposal units at the maximum possible distance from the property boundary, to take advantage of the lower standards that would apply.

Incineration

Subpart E of the 503 regulations deals with sludge incineration. Three POTWs in the study incinerate their sludge. These represent about one-third of the sludge incinerators in California.

The incineration standards for beryllium and mercury consist of the National Emission Standards (40 CFR Part 61, Subparts C and E, respectively) {503.43(a) and (b)}. Thus, only the emissions, not the sludge itself, are regulated for these two pollutants. The relationship between the pollutants in the sludge and the pollutants emitted would presumably be determined on a case-by-case basis.

Beryllium is limited only in incinerator emissions; it is not limited in the other reuse/disposal options in the Part 503 regulations. Because the beryllium emission limit is identical to the National Emission Standard, which was developed based on risk assessment studies, this standard should be sufficiently protective of public health. At this time, it is unknown whether incinerating California sludges will cause violations of this emission limit.

Lead is limited in sewage fed to an incinerator, based on a formula which includes the National Ambient Air Quality Standard for lead {503.43(c)}. Other variables in the formula include a dispersion factor for the incinerator, the incinerator control efficiency, and the sludge feed rate to the unit. These three variables will be specific to each incinerator. The dispersion factor and the control efficiency must be determined by dispersion modeling and performance testing, respectively. Arsenic, cadmium, chromium, and nickel standards are also based on these same types of site-specific criteria {503.43(d)}. Therefore, each POTW operating an incinerator must perform the appropriate tests and calculations to determine the quality of sludge which can be processed through their units. Incinerator operators have indicated that they are planning to perform these tests.

If a sludge currently being incinerated does not meet the calculated limits, other reuse/disposal methods will need to be considered by the POTW. At present, information is not available to indicate whether the 503 standards will prohibit incineration of any California sludges. In the State's current regulatory scheme, emissions from sludge incinerators are regulated by local Air Quality Management Districts.

Comparison of Federal and State Sludge Regulations

Introduction

The purpose of this analysis is to compare the Federal regulation on the disposal of sewage sludge, found at 40 Code of Federal Regulations (CFR) Part 503, and the existing California state regulatory scheme for sewage sludge. The Federal regulations on the disposal of sewage sludge were published on February 19, 1993, at 58 *Federal Register* (FR) 9248. The proposed rule on permit application deadlines was finalized on the same day (58 FR 9404). The effective date of the new regulations was March 22, 1993. The Office of Management and Budget approved the information collection requirements. EPA was required to accept any additional comments and data on the new rule until May 20, 1993.

The published version of Part 503 differs from the version that EPA made available on November 25, 1992 only by the addition of specific dates that previously were described as running from a set period after the publication date.

The deadlines imposed by the new regulation are summarized as follows:

Date	Summary
July 20, 1993	Compliance with monitoring, recordkeeping, and reporting requirements, except for total hydrocarbons in exit gas from sewage sludge incinerator stack.
Next NPDES standards, site-application	Permit application regarding sludge management permit renewal for existing NPDES permittees not subject to specific limits.
180 days before operation	Permit application regarding sludge management standards, for new facilities.
August 18, 1993	Permit application regarding sludge management standards, for existing facilities required to have (or requesting) site-specific limits (primarily existing sewage sludge incinerators).
February 19, 1994	Compliance with sludge management standards, unless construction of new pollution control facilities is required.
February 19, 1994	Compliance with monitoring, recordkeeping, and reporting requirements for total hydrocarbons, unless construction of new pollution control facilities is required.
February 19, 1994	Submission of limited background information relating to permits, for existing non-NPDES permittees not subject to site-specific limits ("sludge-only" permits).
February 19, 1995	Compliance with sludge management standards, and with monitoring, recordkeeping, and reporting requirements for total hydrocarbons, if construction of new pollution control facilities is required.

EPA expects to identify additional pollutants in sludge for possible regulation at some point in the future. EPA will include a schedule for completion of its review of these pollutants.

EPA, in its *State Sludge Management Program Guidance Manual* (October 1990), provides for two approaches a state may take in obtaining sludge program approval. First, the state may expand its existing NPDES program authority. (40 CFR Part 123). Second, the state may establish a non-NPDES program. (40 CFR Part 501). States are free to choose the approach that best suits their organization and needs. Since

California already has an approved NPDES program, it may be less burdensome to simply amend this program to include the required sludge management authorities.

If the State decides to seek sludge program delegation from EPA, it must decide whether it will do so as an extension to the existing NPDES program, or whether to develop a new program. If the State decides to develop a new sludge program, it must then decide which State agencies will be involved in implementing the program.

As outlined by EPA in the *Guidance Manual*, there are several benefits to states in developing and implementing their own sludge management programs:

- Many states, including California, already have experience in sludge management, and have been issuing NPDES permits with sludge requirements for a number of years.

- States are in a better position than the Federal government to implement standards in such a way as to encourage beneficial use of sludge and promotion of sludge as a resource.

- With program approval, states will retain maximum control over state and local decisions and policies governing safe use and disposal of sewage sludge.

- By obtaining program approval, the states will avoid disruption to existing programs and preclude the possibility of POTWs having to obtain both state and Federal permits to operate. This benefit ties in with California's goal of eventually having all permitting consolidated in Cal-EPA.

If the State decides to seek sludge program delegation from EPA, it must decide whether it will do so as an extension to the existing NPDES program, or whether to develop a new program. If the State decides to develop a new sludge program, it must then decide which State agencies will be involved in implementing the program.

Under the Federal regulations, California has the option of integrating its sludge management program into its approved NPDES program; in this scenario, the SWRCB and the RWQCBs would be the sludge permitting agencies. However, alternatively the State may opt to issue sludge permits separately from NPDES permits; thus, CIWMB could issue sludge permits. Another option allowed under 40 CFR Part 501 is to divide sludge permitting responsibilities among several State agencies. This scenario could include the possibility of CIWMB issuing permits to those POTWs intending to dispose of sludge into landfills, while another State agency could issue permits to POTWs practicing other sludge disposal options. However, to the extent that California POTWs are practicing more than one method of sludge disposal, it may be most efficient for a single State agency to handle all sludge permitting.

While California presently imposes extensive regulations on land disposal, substantial additions to the current regulations will be necessary to fully implement the new Federal requirements. Three separate State agencies have issued regulations in areas relevant to sludge management.

The major substantive provisions of the Federal regulation (land application, surface disposal and incineration) are discussed first. Each section includes a description of any analogous state statutes or regulations. Subsequent sections discuss new permit requirements and statutory authority to adopt new state regulations on the issue. The California Integrated Waste Management Board is referred to below as the "Waste Board." The State Water Resources Control Board and the Regional Water Quality Control Boards are referred to collectively as the "Water Boards."

Land Application

Overview

The Federal regulation distinguishes between the use of sewage sludge on land for its fertilizing or soil conditioning properties, which is described as "land application," and the outright disposal of sewage sludge to land without taking advantage of these properties, which is described as "surface disposal" {Subparts B, C). In 40 CFR 503.11(h), land application of sewage sludge is defined as the spraying or spreading of sewage sludge onto the land surface; the injection of sewage sludge below the land surface; or the incorporation of sewage sludge into the soil so that the sewage sludge can either condition the soil or fertilize crops or vegetation grown in the soil (emphasis supplied). In contrast, "surface disposal" is defined by reference to a "surface disposal site," which "is an area of land that contains one or more active sewage sludge units" {503.21(p)}. An active sewage sludge unit "is a sewage sludge unit that has not closed" {503.21(a)}. A sewage sludge unit "is land on which only sewage sludge is placed for final disposal" {503.21(n)} (emphasis supplied).

California employs a similar distinction in its current regulatory scheme. By statute, "agricultural products derived from municipal sewage sludge shall be regulated as a fertilizing material pursuant to this chapter" Food and Agricultural Code (F&A Code) § 14505. The "chapter" referred to contains F&A Code §§ 14501 to 14682.

The Department of Food and Agriculture (DFA) is the primary regulatory agency for the use of sewage sludge for fertilizing or soil conditioning. In contrast, both the Waste Board and the Water Boards regulate disposal of sewage sludge to landfills.

As will be discussed in more detail below, the Federal regulation establishes pollutant limits, management practices, vector and pathogen reduction requirements, sampling and analysis requirements, and recordkeeping and reporting requirements for the land application of sewage sludge. Only a few of these requirements appear in state regulations. The Federal requirements are summarized below, together with any analogous state regulations. The exemption from certain of the requirements available for high-quality sludge is not discussed (see 503.10).

Pollutant Limits

Federal regulation: In addition to overall limits, pollutant limits vary depending upon whether the sludge is applied in bulk or through a bag or other container, and depending upon the use of the land to which the sludge is applied.

No sewage sludge that exceeds specified "ceiling concentrations" for ten metals may be used in any land application {503.13(a)(1) and Table 1}.

Bulk sewage sludge applied to agricultural land, forest, a public contact site, or a reclamation site must either (1) not exceed cumulative pollutant loading rates for the metals, specified in kilograms per hectare, or (2) not exceed monthly average concentrations for the metals, specified in milligrams per kilogram {503.13(a)(2) and Tables 2 and 3}. If the cumulative rates apply, the sludge applier must contact the state permitting authority before application to determine the extent to which such application has occurred in the past {503.12(e)}.

Bulk sewage sludge applied to a lawn or home garden must not exceed specified monthly average concentrations for the metals, which EPA considers high-quality sludge {503.13(a)(3) and Table 3}.

Sewage sludge sold or given away in a bag or other container must either (1) not exceed the high-quality concentrations for the metals, or (2) not exceed annual pollutant loading rates for the metals, specified in kilograms per hectare {503.13(a)(4) and Tables 3 and 4}.

Domestic septage applied to agricultural land, forest or a reclamation site must not exceed an annual application rate, calculated from the amount of nitrogen needed by the crop or vegetation grown on the land {503.13(c)}. Domestic septage is "either liquid or solid material removed from a septic tank, cesspool, portable toilet, Type III marine sanitation device, or similar treatment works that receives only domestic sewage" {503.9(f)}. Domestic septage is included within the meaning of sewage sludge {503.9(w)}.

State regulations: The regulations issued by DFA on fertilizing materials do not contain any specific pollutant limitations {3 California Code of Regulations (CCR) §§ 2300 to 2327}. Instead, the regulations sometimes require submission of a quantitative risk assessment demonstrating that application of the fertilizer product under its use instructions will "prevent a significant amount of a substance known to the State to cause cancer or reproductive toxicity from entering into a source of drinking water as specified in Sections 25249.5 and 25249.9 of the Health and Safety Code," commonly known as Proposition 65 {3 CCR § 2300.1}.

Management Practices

Federal regulation: Bulk sewage sludge may not be applied if a threatened or endangered species or the designated critical habitat of such a species is likely to be adversely affected by the sludge {503.14(a)}.

Bulk sewage sludge may not be applied to agricultural land, forest, a public contact site, or a reclamation site that is flooded, frozen, or snow-covered so that the sludge enters a wetland or other waters of the United States, except as provided in a permit issued pursuant to the Clean Water Act {503.14(b)}.

Bulk sewage sludge may not be applied to agricultural land, forest or a reclamation site that is 10 meters or less from waters of the United States, unless otherwise specified by EPA or the state permitting authority {503.14(c)}.

Bulk sewage sludge may not be applied to agricultural land, forest, a public contact site, or a reclamation site at a whole sludge application rate that exceeds the agronomic rate for the sludge, unless, in the case of a reclamation site, otherwise specified by EPA or the state permitting authority {503.14(d)}. The "agronomic rate" is the whole sludge application rate on a dry weight basis designed (1) to provide the amount of nitrogen needed by the vegetation grown on the land, and (2) to minimize the amount of nitrogen that passes below the root zone of the vegetation to the groundwater {503.11(b)}.

For sewage sludge sold or given away in a bag or other container, either a label must be affixed or an information sheet provided to the recipient (1) stating the name and address of the person who prepared the sludge (either the treatment works that generated the sludge or an intermediate processor), (2) stating that application of the sludge to land is prohibited except in accordance with the instructions on the label or information sheet, and (3) stating the annual whole sludge application rate for the sludge that does not cause any of the annual pollutant loading rates to be exceeded {503.14(e)}.

State regulations: The regulations issued by DFA do not restrict the manner or circumstances under which sludge is applied to the land. Issues regarding endangered species, critical habitat, flooded, frozen or snow-covered land, proximity to water, or agronomic rates are not addressed.

The DFA regulations contain detailed content requirements for labels on fertilizing materials {3 CCR § 2303}. The name and address of the licensee (manufacturer or distributor of the fertilizing material) and "directions for use" are required {3 CCR § 2303(d), (f)}. However, the regulation does not specifically require information on allowable application rates or a statement that application is prohibited except as instructed.

Operational Standards - pathogen and vector attraction reduction

Federal regulation: One of several alternatives for pathogen reduction and one for vector attraction reduction are required for the land application of sewage sludge. The allowable alternatives vary, depending upon whether the sludge is applied in bulk or through a bag or other container, and depending on the use of the land to which the sludge is applied.

Pathogens

The alternatives for pathogen reduction are divided into two classes, Class A and Class B {503.32, 503.33}. The six alternatives in Class A are designed to achieve relatively greater levels of pathogen reduction. The three alternatives of Class B are not as stringent, and require temporary site use restrictions as well.

The Class A alternatives encompass a variety of methods, including heat treatment, raising pH, dewatering, enteric virus density, viable helminth ova density, composting, heat drying, thermophilic aerobic digestion, beta ray irradiation, gamma ray irradiation, and pasteurization {503.32(a)}. All Class A alternatives ultimately require the density of fecal coliform or Salmonella bacteria to be below specified levels.

The Class B alternatives also encompass several methods, including density of fecal coliform, aerobic digestion, air drying, anaerobic digestion, composting and lime stabilization {503.32(b)}. In addition, site use restrictions apply, including delays on growing food crops, feed crops and fiber crops, grazing, turf harvesting and public access.

One of the Class A alternatives must be met for bulk sewage sludge applied to a lawn or home garden, and for sewage sludge sold or given away in a bag or other container {503.15(a)}. One of the Class A or B alternatives must be met when bulk sewage sludge is applied to agricultural land, forest, public contact site or reclamation site {503.15(a)}. For domestic septage applied to agricultural land, forest or reclamation site, only two alternatives are available: either the site use restrictions must be met, or the pH must be raised to a specified level for a specified time {503.32(c)}.

Vectors

Various alternatives are provided for vector attraction reduction. These include volatile solids reduction, meeting a certain specific oxygen uptake rate (SOUR), aerobic digestion, raising pH, dewatering, soil incorporation time limits, and cover {503.33}. Bulk sewage sludge applied to agricultural land, forest, public contact site or reclamation site may use any of the alternatives, except cover {503.15(c)}. Bulk sewage sludge applied to a lawn or home garden and sludge sold or given away in a bag or other container also may use any of the alternatives, except underground injection, soil incorporation time limits, and cover. Domestic septage applied to agricultural land, forest, or reclamation site may use only underground injection, soil incorporation time limits, or raising pH.

State regulations: The DFA regulations do not contain any pathogen or vector attraction reduction requirements for any fertilizing material, including sludge.

Monitoring

Federal regulation: Sludge applied to the land must be monitored to verify compliance with the pollutant limits and pathogen and vector attraction reduction requirements {503.16}. The frequency of monitoring ranges from yearly to monthly, depending upon the amount of sludge involved. If raising pH is used for pathogen or vector control, then each container of domestic septage must be monitored for compliance with those alternatives.

State regulations: Although the DFA regulations describe the procedures for sampling by DFA itself, the regulations do not impose any regular monitoring requirements for sludge used as fertilizing material {3 CCR §§ 2313 to 2317}.

Recordkeeping

Federal regulation: Different recordkeeping requirements are imposed on those who generate the sludge or process the sludge after generation, and those who actually apply the sludge to the land {503.17}. Recordkeeping further varies depending upon whether the sludge is applied in bulk or sold or given away in a bag or other container, and the use of the land to which the sludge is applied. Records must be kept for five years.

Sludge generators and processors generally must keep records of pollutant concentrations, a written certification that certain pathogen and vector control standards have been met, and a description of the manner in which those pathogen and vector control standards have been met.

Sludge appliers generally must keep a written certification that the required management practices, applicable site restrictions and certain pathogen and vector control standards have been met, and a description of the manner in which those management practices, site restrictions, and pathogen and vector control standards have been met.

If the cumulative pollutant loading rate limits apply, then the sludge applier must also keep records of the location and size of the application area, the date, time and amount of application, and cumulative amount of each pollutant applied. If the annual whole sludge application rate limit applies, then the sludge generator or processor must also keep records of that rate.

Domestic septage appliers must keep records of the location and size of the application area, the date and time of application, the nitrogen requirement of the vegetation on the application area, the rate of application, a description of the manner in which pathogen and vector control standards have been met, and a written certification that the pathogen and vector control standards have been met.

State regulations: Under DFA regulations, manufacturers and distributors of fertilizing materials are required to keep records, for three years, only of sales transactions, for purposes of assessments {F&A Code § 14612}.

Reporting

Federal regulation: The reporting requirements generally are imposed only on POTWs required to have an approved pretreatment program, POTWs with a design flow rate of at least 1 million gallons per day, and POTWs serving at least 10,000 people {503.18}. These POTWs must annually submit copies of all of the records discussed above that they are required to maintain. Location and other information also must be submitted when sites subject to the cumulative pollutant loading rates reach at least 90% of any of such rates.

All sludge preparers and processors also must provide sludge appliers with all information needed to comply with the regulation {503.12(d), (f)}. The applier must provide the owner or lease holder of the land with notice and all information needed to comply with the regulation {503.12(h)}. Appliers of sludge subject to the cumulative pollutant loading rate limits must provide specified prior notice to the state permitting authority {503.12(j)}. If any sludge is applied to land in another state, the generator or processor must provide specific information for prior notice to the permitting authority of that state {503.12(i)}.

State regulations: The DFA regulations require only the semiannual submission of a tonnage report on shipments received or delivered by manufacturers and distributors of fertilizing material {F&A Code § 14621; 3 CCR § 2321}.

Surface Disposal

Overview

As noted above, the Federal regulation applies to the surface disposal of sludge into sludge-only disposal sites, such as to a sludge-only landfill. The regulation does not apply to the disposal of sludge into sites which accept other wastes, such as a municipal solid waste landfill (MSWLF) {503.4}.

The disposal of sludge into MSWLFs is regulated instead by 40 CFR Part 258. Sludge generators and processors must ensure that the sewage sludge meets the requirements of Part 258 concerning the quality of materials disposed in a MSWLF {503.4}. Those requirements are the ban on hazardous waste disposal, daily cover of six inches of earthen material or equivalent, and the ban on bulk liquid or noncontainerized liquid waste, which is waste that contains free liquids under the Paint Filter Liquids Test {258.20, 258.21, 258.28}.

As for land application, the Federal regulation for surface disposal of sludge establishes pollutant limits, management practices, pathogen and vector attraction reduction requirements, and monitoring, recordkeeping and reporting requirements. Some of these requirements already are imposed by the regulations of the Waste Board and Water Boards. The Federal requirements are summarized below, together with the analogous state regulations.

Pollutant Limits

Federal regulation: No pollutant limits are imposed for the disposal of domestic septage or for disposal sites with a liner and leachate collection system {503.23}. Other sewage sludge disposed of to sites without a liner and leachate collection system must not exceed specified limits for arsenic, chromium and nickel {503.23(1), (2) and Tables 1 and 2}. The permitting authority is allowed to establish higher site-specific limits.

State regulations: Apart from regulations on the disposal of hazardous wastes in general, California's regulations do not impose numerical limits on the concentration of arsenic, chromium and nickel in sludge disposed of to land.

Management Practices

Federal regulation: A number of site management practices are imposed by the Federal regulation {503.24}.

Sludge must not be placed on the site if a threatened or endangered species or its designated critical habitat is likely to be adversely affected.

The disposal site must not restrict the flow of a base flood. A base flood "is a flood that has a one percent chance of occurring in any given year (i.e., a flood with a magnitude equaled once in 100 years)" {503.9(b)}.

When the site is located in a seismic impact zone, an active sewage sludge disposal unit must be designed to withstand the maximum recorded horizontal ground level acceleration. A seismic impact zone "is an area that has a 10 percent or greater

probability that the horizontal ground level acceleration of the rock in the area exceeds 0.10 gravity once in 250 years" {503.21(m)}.

An active sewage sludge unit must not be located in an unstable area. An unstable area "is land subject to natural or human-induced forces that may damage the structural components" of a disposal site, including "land on which the soils are subject to mass movement" {503.21(q)}.

An active sewage sludge unit must not be located in a wetland, except as provided in a Clean Water Act permit.

Runoff from an active sewage sludge unit must be collected and properly disposed of. The runoff collection system must have the capacity to handle runoff from a 24-hour, 25-year storm.

Any leachate collection system must be operated and leachate properly disposed of until three years after the sewage sludge unit closes.

When cover is placed on an active sewage sludge unit, the methane gas concentration of the air in any structure within the disposal site must not exceed 25% of the lower explosive limit (LEL), and the methane gas concentration of the air at the property line of the site must not exceed the LEL. These same limits apply for three years after a final cover is placed on an inactive sewage sludge unit.

Food, feed and fiber crops may not be grown, and animals may not be grazed, on an active sewage sludge unit unless the owner or operator of the site demonstrates to the permitting authority that public health and the environment are protected from reasonably anticipated adverse effects of pollutants in the sludge.

Public access to the disposal site must be restricted while the site contains an active sewage sludge unit and for three years after the last active sewage sludge unit in the site closes.

Sewage sludge placed on an active sewage sludge unit may not cause groundwater to exceed the maximum contaminant level (MCL) for nitrate, and may not increase the nitrate concentration of groundwater that already exceeds the nitrate MCL. The results of a groundwater monitoring program developed by a qualified groundwater scientist, or a certification by such a scientist, must be used to demonstrate that such contamination is not occurring.

State regulations: The California regulations do not contain any equivalent prohibition on disposal that might affect endangered or threatened species or their critical habitat, or on disposal to a wetland.

Landfills that can accept sludge must be "designed, constructed, operated and maintained to prevent inundation or washout due to floods with a 100-year return period" {23 CCR § 2533(c)}.

New landfills and expansions of existing landfills must not be located on a known Holocene fault {23 CCR § 2533(d)}. A Holocene fault is "a fault which is or has been active during the last 11,000 years" {23 CCR § 2601}. Existing landfills "may be located on a known Holocene fault, provided that containment structures are capable of withstanding ground accelerations associated with the maximum probable earthquake" {23 CCR § 2533(d)}. Ground acceleration is "acceleration of earth particles caused by an earthquake" {23 CCR § 2601}. A maximum probable earthquake is "the maximum earthquake that is likely to occur during a 100-year interval" {23 CCR § 2601}. New and existing landfills must be "designed to withstand the maximum probable earthquake without damage to the foundation or to the structures which control leachate, surface drainage, erosion or gas" {23 CCR § 2547}.

New and existing landfills "may be located within areas of potential rapid geologic change if containment structures are designed, constructed, and maintained to preclude failure." Rapid geologic change is "alteration of the ground surface through such actions as landslides, subsidence, liquefaction, and faulting" {23 CCR §§ 2533(e), 2601}.

Precipitation on landfills not diverted by covers or drainage control systems must be collected and managed through the leachate collection and removal system (LCRS), which must be designed and constructed to accommodate a 100-year, 24-hour precipitation event. This State provision is stricter than the Federal requirement {23 CCR § 2546 and Table 4.1}.

Landfills accepting sewage sludge must have an LCRS. Collected leachate must be returned to the waste management unit from which it came or be discharged in another manner approved by the Waste Board and the Regional Board. The LCRS must continue to be operated and the leachate properly disposed of throughout the postclosure period, as long as leachate is detected {23 CCR § 2543, 2581; 14 CCR § 17781}.

No specific methane gas monitoring requirements apply before closure, although such requirements may be imposed if there is "cause to believe a hazard or nuisance may be created by landfill decomposition gases" {14 CCR § 17705}. During closure and for 30 years postclosure, methane gas must be monitored within on-site structures and at the perimeter of the site. During this time, the concentration of methane gas must not exceed 1.25% by volume in the air of on-site structures, or 5% by volume in air at the facility property boundary {14 CCR §§ 17783 to 17783.17}.

The regulations do not specifically address growing food, feed or fiber crops on active sewage sludge units. "Grazing of livestock away from operating areas is permitted" {14 CCR § 17702}.

The regulations do not specifically prohibit public access to sites containing active sewage sludge units. However, public access is restricted during the postclosure period {14 CCR § 17767}.

Landfills are required to install a groundwater monitoring system, and the Regional Board must establish concentration limits for constituents of concern {23 CCR §§ 2550 to 2550.12}. However, there is no specific requirement regarding nitrate concentrations in groundwater or the qualifications of the person who develops or certifies the results of the monitoring system.

Operational Standards - pathogen and vector attraction reduction

Federal regulation: For surface disposal of sewage sludge other than domestic septage, one of the Class A or Class B pathogen control alternatives discussed earlier must be met, unless the sludge is covered with soil at the end of each operating day {503.23(a)}.

For sewage sludge other than domestic septage, one of the vector control alternatives must be met, such as daily cover {503.25(b)}.

For domestic septage, the vector control alternatives involving underground injection, soil incorporation time limits, daily cover, or raising pH must be met {503.25(c)}. No additional pathogen control requirements are imposed on disposal of domestic septage.

State regulations: Cover is required every one to four days, depending upon the amount of waste at the disposal site. Daily cover is imposed for tonnage greater than 50 tons per day {14 CCR § 17682}. None of the pathogen controls or other vector controls required by the Federal regulation is specifically addressed by California's regulations.

Closure

Federal regulation: The owner or operator of any disposal site must submit a written closure and postclosure plan to the permitting authority 180 days before closure {503.22(c)}. The plan must describe the manner in which closure will occur, including the manner in which any leachate collection system will be operated and maintained, the system used to monitor for methane gas in the air of any structures within the site and in the air at the property line of the site, and the restrictions on public access for three years after closure. The disposal site owner must notify the subsequent owner that sewage sludge was placed on the land {503.22(d)}.

Unless otherwise specified by the permitting authority, an existing disposal site must close within a year after the effective date of the Federal regulation, if the site is located within 60 meters of a fault that has displacement in Holocene time, located in a unstable area, or located in a wetland, except as provided in a Clean Water Act permit {503.22(b)}.

State regulations: California regulations do not mandate closure for disposal sites near faults or unstable areas or within wetlands. As described above, existing landfills that can accept sludge "may be located on a known Holocene fault, provided that containment structures are capable of withstanding ground accelerations associated with the maximum probable earthquake." Existing landfills must be "designed to withstand the maximum probable earthquake without damage to the foundation or to the structures which control leachate, surface drainage, erosion or gas." Existing landfills "may be located within areas of potential rapid geologic change if containment structures are designed, constructed, and maintained to preclude failure" {23 CCR § 2533(d),(e), 2547, 2601}.

Both the Waste Board and the Water Boards have detailed closure requirements for disposal sites {14 CCR §§ 17760 to 17796, 18250 to 18277; 23 CCR §§ 2580 to 2581}. Closure and postclosure plans generally must be submitted two years before closure, earlier than the Federal requirement {14 CCR § 18255}. The plans must describe the closure and postclosure process in detail, including leachate control, methane gas monitoring and site security {14 CCR §§ 17767, 17781, 17783 to 17783.17, 18262.3, 18265.3}. Before title to a disposal site is transferred, the owner must notify the new owner of the existence of the state regulations and of the conditions and agreements assuring compliance {14 CCR § 17792}.

Monitoring

Federal regulation: For sewage sludge other than domestic septage, monitoring for pollutant limits, pathogen control and certain vector controls (not including cover) is required annually to monthly, depending on the amount of sludge {503.26(a)}.

If raising pH is used for domestic septage vector control, each container must be monitored for compliance {503.26(b)}.

Continuous monitoring for methane gas is required for air in structures within the disposal site and for air at the property line of the site during the period of operation of an active sewage sludge disposal unit and for three years after closure {503.26(c)}.

State regulations: The regulations do not impose monitoring requirements for pollutant limits or for pathogen or vector control.

As discussed above, the regulations do not impose general methane monitoring requirements prior to closure. During closure and for 30 years after closure, "at a minimum, quarterly monitoring is required" {14 CCR §§ 17783, 17783.11}.

Recordkeeping

Federal regulation: Different recordkeeping requirements are imposed on those who generate the sludge or process the sludge after generation, and those who own or operate the disposal site or who actually place the sludge on the site {503.27}. Recordkeeping further varies depending upon whether the sludge is domestic septage or other sludge. Records must be kept for five years.

Sludge generators and processors generally must keep records of pollutant concentrations, a written certification that certain pathogen and vector control standards have been met, and a description of the manner in which those pathogen and vector control standards have been met.

Owners or operators of disposal sites generally must keep records of certain pollutant concentrations, a written certification that the required management practices and certain vector control standards have been met, and a description of the manner in which those management practices and vector control standards have been met.

Domestic septage appliers who raise pH to control vectors must keep a description of the manner in which this vector control standard was met and a written certification that this standard was met.

State regulations: Although extensive recordkeeping requirements are imposed on landfill operators, these requirements do not include those imposed by the Federal regulation.

Reporting

Federal regulation: The reporting requirements generally are imposed only on POTWs required to have an approved pretreatment program, POTWs with a design flow rate at least 1 million gallons per day, and POTWs serving at least 10,000 people {503.18}. These POTWs must annually submit copies of all of the records discussed above.

State regulations: Once again, although extensive reporting requirements are imposed on landfill operators, these requirements do not include those imposed by the Federal regulation.

Incineration

The provisions of the Federal regulation on the incineration of sewage sludge deal primarily with air emissions. The only state regulation of air emissions from sludge incinerators is a provision by the Air Resources Board establishing a test method for mercury emissions from sewage sludge incinerators {17 CCR §§ 94100, 94126}. Otherwise, air emissions are regulated by the regional and local air quality management districts and air pollution control districts, which vary in their approach to this issue. An analysis of these local and regional requirements is beyond the scope of this report.

The discussion below summarizes the provisions of the Federal regulation on sludge incineration, without an accompanying summary of analogous state regulations. The Federal regulation imposes pollutant limits, an operational standard for total hydrocarbons, management practices, and monitoring, recordkeeping and reporting requirements.

Pollutant Limits

Sewage sludge incineration must not violate the national emission standards for beryllium and mercury {503.43}. The daily concentration of lead in the sludge cannot exceed a level derived from the national ambient air quality standard for lead, a dispersion factor, control efficiency and feed rate. Daily concentration limits for arsenic, cadmium, chromium and nickel also apply, calculated from control efficiency, dispersion factor, certain risk-specific concentrations, and feed rate.

Operational Standard - total hydrocarbons

The monthly average concentration of total hydrocarbons in the exit gas from the sludge incinerator, corrected for zero percent moisture and to seven percent oxygen, cannot exceed 100 parts per million {503.44}.

Management Practices

Instruments that measure and record the concentration of total hydrocarbons, oxygen, moisture, and combustion temperature, must be installed {503.45}. The permitting authority must specify the maximum combustion temperature and operating parameters for the air emission control equipment. Sludge may not be incinerated if a threatened or endangered species or its designated critical habitat is likely to be adversely affected.

Monitoring

The permitting authority must specify the monitoring frequency for beryllium and mercury {503.46}. Arsenic, cadmium, chromium, lead and nickel must be monitored annually to monthly, depending on the amount of sludge incinerated. Total hydrocarbon, oxygen and moisture concentration of the exit gas and combustion temperatures must be monitored continuously. The permitting authority must specify the monitoring frequency for emission control equipment parameters.

Recordkeeping

The operator of the incinerator must keep, for five years, records on the concentration of the pollutants in the sludge, total hydrocarbons concentration in the exit gas, information establishing that the national emission standards for beryllium and mercury are met, combustion temperatures, emission control equipment operating parameters, oxygen and moisture concentration in exit gas, feed rate, stack height, dispersion factor, control efficiency, risk-specific concentrations, and a calibration and maintenance log for the monitoring equipment {503.47}.

Reporting

Most of the information required to be maintained must be submitted annually to the permitting authority by POTWs required to have a pretreatment program and POTWs with a design flow rate at least 1 million gallons per day or serving at least 10,000 people {503.48}.

Permits

Not all persons subject to the Federal regulation must obtain a permit. Permit requirements are imposed only on POTWs and other "treatment works treating domestic sewage" {503.3}. As clarified in the preamble to the Federal regulation, treatment works treating domestic sewage requiring a permit are POTWs and any other facility engaged in the treatment or reclamation of municipal or domestic sewage, including surface disposal sites and incinerators. Permits would be required for facilities that alter the nature or quality of the sludge after the sludge is generated by the POTW, such as by using stabilizing, composting, digestion or heat treatment processes, or by blending the sludge with sludge from another POTW or with bulking agents such as sawdust or wood chips. EPA does not consider dewatering or the placement of the sludge into a bag or other container for sale or give-away to constitute treatment or a change in sludge quality requiring a permit.

For POTWs and other facilities already subject to WDRs, the requirements of the Federal regulation can be imposed through revisions to the WDRs. Surface disposal sites also can be reached through modifications to their required solid waste facility permits. POTWs practicing sludge incineration can be regulated through modification of the air quality management districts or air pollution control districts' authority to construct and permit their emission control equipment. The only currently unpermitted group may be intermediate sludge processors that neither generate the sludge themselves nor engage in actual land disposal.

Agency Authority

Both the Waste Board and the Water Boards have ample statutory authority to issue any new regulations needed to implement the Federal regulation in California.

The Waste Board has authority to issue regulations establishing "minimum standards for solid waste handling, transfer, composting, transformation, and disposal for the protection of air, water, and land from pollution" {Public Resources Code § 43020}.

The State Board is designated as the California state water pollution control agency for all purposes under the Federal Clean Water Act, and "is authorized to exercise any powers delegated to the state" by the Clean Water Act and its amendments {Water Code § 13160}. WDRs have been deemed to be "permits" under the Clean Water Act {Water Code § 13374}. Any person proposing to operate a POTW or other treatment works treating domestic sewage is required to file a report of waste discharge and obtain WDRs {Water Code § 13376}. The Water Boards are specifically authorized to issue WDRs that ensure compliance with all applicable provisions of the Clean Water Act and its amendments {Water Code § 13377}.

Approval of State Sludge Management Programs

EPA has issued a comprehensive guidance document on the steps necessary for a state to obtain approval of its sludge management program, entitled *State Sludge Management Program Guidance Manual* (EPA, Office of Water, October 1990). This document contains a statutory and regulatory requirements checklist and a program description checklist.

Summary of Conclusions and Recommendations

Conclusions:

- The Federal sludge regulations make no statements concerning which State agencies should implement the regulations. If the State decides to seek program delegation, it will need to evaluate whether to continue the existing regulatory scheme; that is, whether to incorporate necessary changes into existing regulations, or to adopt the Federal regulation intact in its present form as a new State regulation.

- If the State decides to seek sludge program delegation from EPA, it must decide whether it will do so as an extension to the existing NPDES program or develop a new program. If the State decides to develop a new sludge program, it must then determine which State agencies will be involved in implementing the program.

- California should evaluate whether to impose constraints on sludge reuse/disposal options by POTWs whose sludges exceed the cutoff values for certain pollutants listed in Part 503 Preamble Table III-2 (Attachment 1). Currently, no POTWs in this study who exceeded these cutoff values are practicing the sludge reuse/disposal methods associated with the cutoff values. However, it is possible that other California POTWs that practice the associated reuse/disposal methods may have sludges which exceed these values. California could restrict from disposal by a particular option a sludge which exceeded a cutoff value for that reuse/disposal option.

- By far the majority of POTWs in the Study were able to meet EPA's ceiling concentration limits in all samples, for all pollutants. California sludges appear to be cleaner on average than sludges analyzed in the National Sewage Sludge Survey.

Recommendations

Standardize Definitions: To enhance consistency and the ability of POTWs to comply with sludge regulations, State agencies should consider using definitions of sludge reuse and disposal identical to those contained in the Federal regulations.

Base Future Decisions on Comprehensive Data: The sludge data collected during this Study provide a new database in which the State can collect the large amount of sludge reporting that will be required under the Part 503 regulations. Collection of these data will aid the State in making informed, supportable decisions regarding sludge reuse and disposal in California. If the sludge data reported by the POTWs are not collected in an organized manner such as this, it will be very difficult to use the data.

Continue a Good Working Relationship with EPA: The State has interests both in ensuring that sludges do not impact human health or the environment, and that maximum flexibility for reuse of sludges can be maintained under State and Federal regulations. In order to ensure that these interests are met, the State should offer advice on the State's perspective to EPA as Region 9 moves towards finalizing its protocol for determining sludge compliance with Part 503 limits.

Alternate Standards are Provided for Some Disposal Options: Sludges which do not meet concentration-based limits for land application should be evaluated for their ability to meet alternate standards based on cumulative or annual loading rates to the area receiving the sludge.

Summary of Additions Needed to State Regulations:

Comparison Chart of Federal and State Sludge Regulations	
Federal Regulation (40 CFR Part 503)	State Regulation Equivalency?
I. Land Application	
Management practices	No (except Proposition 65)
Pathogens/vectors	No (except some label information)
Monitoring, recordkeeping, reporting	No
II. Surface Disposal	
Pollutant limits	No
Management practices	
endangered species	No
flood flow	Yes
seismic zone	No
unstable area	No
wetland	No
run-off	Yes
leachate	Yes
methane	No (except postclosure)
crops/grazing	No
public access	No (except postclosure)
nitrate	No
Pathogens/vectors	No (except when daily cover required for tonnage greater than 50 tons/day)
Closure	Yes
Monitoring, recordkeeping, reporting	No
III. Incineration	Not in state-wide regulations

ATTACHMENT 1

PREAMBLE TABLE III-2

"Pollutants Evaluated and Found Not to Interfere with Sewage Sludge Use or Disposal"

TABLE III-2

POLLUTANTS EVALUATED AND FOUND NOT TO INTERFERE WITH SEWAGE SLUDGE USE OR DISPOSAL

Pollutants	Use/Disposal Practice (Concentration)
Chlordane	Monofill over Class II, III ground water (12 mg/kg)
Chromium	Monofill over Class II, III ground water (1,499.7 mg/kg)
Copper	Incineration (1,427 mg/kg)
Cyanide*	Land Application, Distribution and Marketing, Monofill (2,686.6 mg/kg)
Dimethyl nitrosamine*	Distribution and Marketing (2.55 mg/kg)
2,4-Dichlorophenoxy-acetic acid	Monofill (7.16 mg/kg)
Fluoride*	Land Application, Distribution and Marketing (738.7 mg/kg)
Heptachlor	Incineration (0.09 mg/kg)
Iron*	Land Application, Distribution and Marketing (8,700 mg/kg)
Malathion	Monofill (0.63 mg/kg)
Molybdenum	Monofill (40 mg/kg)

Pollutants	Disposal Practice (Concentration)
Nickel	Monofill over Class II, III ground water (662.7 mg/kg)
Pentachlorophenol	Land Application, Distribution and Marketing (30.43 mg/kg)
Phenol	Monofill (82.06 mg/kg)
Selenium	Monofill, Incineration (4.85 mg/kg)
Tetrachloroethylene*	Distribution and Marketing (13.07 mg/kg)
Zinc	Monofill, Incineration (4,580 mg/kg)

* Exposure assessment models were used in determining that these pollutants, at the concentrations shown, do not interfere with the use or disposal of sewage sludge.

ATTACHMENT 2

POTWs Originally Identified by RAC for Inclusion in Study

List of POTWs Originally Identified by the RAC

CITY_COUNT	PERMIT_NO
Anderson	CA0077704
Bakersfield	N/A
Bakersfield	N/A
Central Contra Costa	CA0037648
Chino Basin	CA0105279
Chino Basin	CA0105287
Chino Basin	CA8000073
Corning	CA0004995
Delta Diablo	CA0038547
Dublin/San Ramon	CA0037613
Dunsmuir	CA0078441
EBMUD	CA0037702
EBMUD	CA0038440
El Centro	N/A
El Dorado	N/A
Eureka	CA0024449
Encina	CA0107395
Exeter	CA0080233
Fallbrook	CA0108031
Fresno	77-67
Manteca	CA0081558
Modesto	CA0079103
Monterey	CA0048551
Napa	CA0037575
Orange County	CA0110604
Oroville	CA0079235
Palo Alto	CA0037834
Redding	CA0079731
Redding	CA0082589
Reedley	CA0817230
Rialto	CA0105295
Riverside	CA0105350
Running Springs	N/A
Sacramento Regional	CA0077682
Santa Barbara	CA0048143
San Diego	CA0107409
San Jose/Santa Clara	CA0037842
San Luis Obispo	CA0049224
Santa Rosa	CA0022764
Shasta Dam PUD	N/A
South Lake Tahoe	CA0105279
Taft	CA0080161
Truckee	N/A
Thousand Oaks	CA0056294
Tracy	CA0079154
Vallejo	CA0037699
West Contra Costa	CA0038539
West Sacramento	CA0079171

ATTACHMENT 3

POTWs Responding in Some Way to Request for Information

List of POTWs Responding to Survey

CITY_NAME	PERMIT_NO
Anderson	CA0077704
Bakersfield	N/A
Bakersfield	N/A
CCCSD	CA0037648
Chino Basin 1	CA0105279
Chino Basin 2	CA0105287
Chino Basin 2	CA8000073
Corning	CA0004995
Delta Diablo	CA0038547
Dublin/San Ramon	CA0037613
Dunsmuir	CA0078441
EBMUD	CA0037702
Encina	CA0107395
Eureka	CA0024449
Fallbrook	CA0108031
Fresno	77-67
Manteca	CA0081558
Modesto	CA0079103
Monterey	CA0048551
Napa	CA0037575
Orange County	CA0110604
Oroville	CA0079235
Palo Alto	CA0037834
Redding - CC	CA0079731
Redding - SW	CA0082589
Rialto	CA0105295
Riverside	CA0105350
Running Springs	N/A
Sacto Regional	CA0077682
San Diego	CA0107409
San Jose	CA0037842
San Luis Obispo	CA0049224
Santa Barbara	CA0048143
Santa Rosa	CA0022764
South Tahoe	CA0105279
Taft	CA0080161
Tahoe/Truckee	N/A
Thousand Oaks	CA0056294
Tracy	CA0079154
Vallejo	CA0037699
West Contra Costa	CA0038539
West Sacramento	CA0079171

ATTACHMENT 4

Flow Rates of POTWs in the Sewage Sludge Study

FLOW RATES OF POTWs IN THE SEWAGE SLUDGE STUDY

Facility Name	Avg Fl
Anderson Water Pollution Control Plant	1.35
Bakersfield Plant 2	17.50
Bakersfield Plant 3	8.30
Central Contra Costa Sanitation District	35.00
Chino Basin Regional Plant #1	32.50
Chino Basin Regional Plant #2	5.10
Carbon Canyon Water Reclamation Facility	3.30
Corning Waste Water Treatment Plant	1.08
Delta Diablo Sanitation District	9.60
Dublin San Ramon Services District Regional WWTF	7.40
Dunsmuir Wastewater Treatment Facility	0.29
EBMUD Main Treatment Plant	70.00
Encina Water Pollution Control Facility	19.00
Elk River Water Treatment Plant	5.24
Fallbrook Sanitary District	1.50
Fresno-Clovis Regional Waste Water Facility #1	58.04
Manteca Waste Water Quality Control Facility	4.54
Modesto Water Quality Control Facility	25.80
Monterey Regional Waste Water Treatment Plant	19.00
Napa Sanitation District, Imola Plant	8.00
Orange County Plant #1 & 2	225.00
Oroville Region Sewerage Commission	3.00
Palo Alto Regional Water Quality Control Plant	22.00
Clear Creek Waste Water Treatment Plant, Redding	7.20
Stillwater Waste Water Treatment Plant, Redding	1.60
Rialto Municipal Wastewater Treatment Facility	5.75
Riverside Water Quality Control Plant	29.40
Running Springs Water Pollution Control Plant	0.55
Sacramento Regional	115.00
Point Loma Waste Water Treatment Plant, San Diego	182.00
San Jose/Santa Clara Water Pollution Control Plant	103.00
San Luis Obispo Water Reclamation Facility	3.60
El Estero Wastewater Treatment Plant	8.00
Laguna Waste Water Treatment Plant	17.80
South Tahoe Public Utilities District	4.50
City of Taft Waste Water Treatment Facility	0.80
Tahoe/Truckee Sanitation District	3.65
Hill Canyon Waste Water Treatment Plant	8.30
City of Tracy Waste Water Treatment Plant	5.45
Vallejo Sanitation & Flood Control	11.00
West Contra Costa Sanitary District WPCP	6.50
West Sacramento Wastewater Treatment Plant	4.05

ATTACHMENT 5

Summary of Sludge Reuse/Disposal Methods Employed by POTWs in the Sewage Sludge Study

SUMMARY OF SLUDGE REUSE\DISPOSAL METHODS

Facility Name	Disposal Type 1	Disposal Type 2
Anderson Water Pollution Control Plant	Landfill	
Bakersfield Plant 2	Stockpile	Land application
Bakersfield Plant 3	Stockpile	Land application
Central Contra Costa Sanitation District	Incineration - sludge	Landfill - ash
Chino Basin Regional Plant #1	Compost	
Chino Basin Regional Plant #2	Compost	
Carbon Canyon Water Reclamation Facility	Goes to Reg Plant #2	
Corning Waste Water Treatment Plant	Land application	
Delta Diablo Sanitation District	Land application	
Dublin San Ramon Services District Regional WWTF	Surface disposal	
Dunsmuir Wastewater Treatment Facility	Landfill	
EBMUD Main Treatment Plant	Landfill	Compost
Encina Water Pollution Control Facility	Compost	Land application
Elk River Water Treatment Plant	Land application	
Fallbrook Sanitary District	Compost	Thermophilic; vermic
Fresno-Clovis Regional Waste Water Facility #1	Stockpile	Land application
Manteca Waste Water Quality Control Facility	Land application	
Modesto Water Quality Control Facility	Land application	
Monterey Regional Waste Water Treatment Plant	Landfill	
Napa Sanitation District, Imola Plant	Landfill	
Orange County Plant #1 & 2	Compost	Land Application
Oroville Region Sewerage Commission	Land application	
Palo Alto Regional Water Quality Control Plant	Incineration - sludge	Metals reclamation -
Clear Creek Waste Water Treatment Plant, Redding	Landfill	
Stillwater Waste Water Treatment Plant, Redding	Landfill	
Rialto Municipal Wastewater Treatment Facility	Compost	
Riverside Water Quality Control Plant	Compost	
Running Springs Water Pollution Control Plant	Compost	
Sacramento Regional	Surface disposal	
Point Loma Waste Water Treatment Plant, San Diego	Compost	
San Jose/Santa Clara Water Pollution Control Plant	Stockpile	
San Luis Obispo Water Reclamation Facility	Land application	
El Estero Wastewater Treatment Plant	Land application	

Facility Name	Disposal Type 1	Disposal Type 2
Laguna Waste Water Treatment Plant	Landfill	
South Tahoe Public Utilities District	Incineration - sludge	Landfill - ash
City of Taft Waste Water Treatment Facility	Stockpile	
Tahoe/Truckee Sanitation District	Landfill	
Hill Canyon Waste Water Treatment Plant	Landfill	
City of Tracy Waste Water Treatment Plant	Land application	
Vallejo Sanitation & Flood Control	Land application	
West Contra Costa Sanitary District WPCP	Landfill	
West Sacramento Wastewater Treatment Plant	Landfill	

APPENDIX 1

Database of Part 503 Pollutants

(in original sample units of wet or dry weights)

from

'ANALYZE1'

503 PARAMETERS - WET OR DRY WEIGHT IN MG/KG

CITY NAME	DATE	TYPE	ARSENIC	BERYLLIUM	CADMIUM	CHROM	COPPER	LEAD	MERCURY	MO	NICKEL	SELENIUM	ZINC
Anderson	02/27/92		-888.000	-888.00	0.02	0.09	2.42	0.85	-888.000	-888.00	0.08	-888.00	3.92
Anderson	08/09/90		-888.000	-888.00	5.00	22.00	840.00	210.00	-888.000	-888.00	23.00	-888.00	1000.00
Anderson	08/11/89		-888.000	-888.00	9.20	59.00	1100.00	270.00	-888.000	-888.00	47.00	-888.00	1700.00
Bakersfield	1991		8.400	-0.20	5.10	34.30	479.00	373.00	3.100	-888.00	24.30	3.50	1407.00
Bakersfield	1992		5.600	-888.00	3.20	20.10	303.00	32.60	2.400	6.70	10.70	5.10	575.00
Bakersfield	1/5/93	wet	-10.000	-1.00	-2.50	10.00	54.00	7.40	0.350	-2.50	4.90	-15.00	150.00
Bakersfield	1/5/93	wet	-10.000	-1.00	3.40	42.00	330.00	37.00	1.000	7.60	14.00	-15.00	820.00
CCCSD	03/11/92		0.300	-999.00	-999.00	3.70	48.00	6.80	0.480	-999.00	2.00	0.70	66.40
CCCSD	03/12/91		-999.000	-999.00	-999.00	-999.00	50.00	1.40	0.100	-999.00	-999.00	1.04	-999.00
CCCSD	09/05/91		1.100	-999.00	0.90	5.00	76.00	9.90	0.810	-888.00	3.00	1.00	110.00
CCCSD	09/16/91		0.600	-888.00	-888.00	5.00	-888.00	-888.00	-888.000	-888.00	-888.00	0.60	-888.00
CCCSD	3/16/93	wet	-10.000	-1.00	-2.50	6.00	60.00	5.20	1.100	-2.50	4.80	-15.00	75.00
CCCSD	3/23/93	wet	-10.000	-1.00	-2.50	14.00	63.00	-5.00	1.300	-2.50	8.20	-15.00	75.00
Chino Basin 1	09/28/92	wet	-888.000	-888.00	-888.00	-888.00	-888.00	-888.00	-888.000	-888.00	-888.00	-888.00	-888.00
Chino Basin 2	09/28/92	wet	-888.000	-888.00	-888.00	-888.00	-888.00	-888.00	-888.000	-888.00	-888.00	-888.00	-888.00
Chino Basin 1	1/4/89	dry	-6.000	-888.00	87.00	413.00	407.00	127.00	6.000	-888.00	33.00	3.00	1800.00
Chino Basin 2	1/4/89	dry	-7.000	-888.00	6.00	54.00	800.00	267.00	7.000	-888.00	40.00	4.00	667.00
Chino Basin 1	3/13/89	dry	-888.000	-888.00	58.00	290.00	471.00	87.00	-888.000	-888.00	29.00	-888.00	2609.00
Chino Basin 2	3/13/89	dry	-888.000	-888.00	4.00	61.00	976.00	348.00	-888.000	-888.00	37.00	-888.00	915.00
Chino Basin 1	12/1/89	dry	-67.000	-888.00	37.00	287.00	513.00	140.00	7.000	-33.00	28.00	-33.00	2533.00
Chino Basin 2	12/1/89	dry	-67.000	-888.00	5.00	61.00	1267.00	180.00	-888.000	-33.00	65.00	-33.00	1067.00
Chino Basin 1	1991	dry	7.000	-888.00	-7.25	67.50	563.50	102.50	-2.000	12.00	18.25	7.25	-1190.00
Chino Basin 2	1991	dry	16.000	-888.00	-8.75	66.00	666.00	84.50	-2.250	46.00	26.25	9.00	-937.00
Chino Basin 1	1992	dry	7.000	-888.00	-4.80	61.00	465.00	89.30	-1.300	10.00	32.75	6.75	945.00
Chino Basin 2	1992	dry	8.000	-888.00	-3.60	4.80	186.00	59.00	-1.280	13.00	25.00	6.75	737.00
Chino Basin 1	89-90	wet	-888.000	-888.00	-888.00	-888.00	-888.00	-888.00	-888.000	-888.00	-888.00	-888.00	-888.00
Chino Basin 2	89-90	wet	-888.000	-888.00	-888.00	-888.00	-888.00	-888.00	-888.000	-888.00	-888.00	-888.00	-888.00
Chino Basin 1	90-91		1.000	-888.00	4.00	37.00	76.60	16.00	0.530	-888.00	4.70	0.60	320.00
Chino Basin 2	90-91		2.000	-888.00	0.60	10.00	160.00	33.70	0.370	-888.00	4.70	2.00	150.00
Chino Basin	3/5/93	wet	-10.000	-1.00	-2.50	22.00	62.00	11.00	0.420	2.70	14.00	-15.00	130.00
Chino Basin	3/13/93	wet	-10.000	-1.00	-2.50	21.00	62.00	12.00	0.550	-2.50	13.00	-15.00	130.00
Corning	10/15/92		-888.000	-888.00	6.00	82.00	477.00	179.00	-888.000	-888.00	32.00	-888.00	1020.00
Corning	3/22/93	wet	19.000	-1.00	-2.50	24.00	88.00	42.00	0.880	-2.50	10.00	-15.00	300.00
Corning	3/22/93	wet	-10.000	-1.00	-2.50	40.00	5.80	-5.00	-0.050	-2.50	17.00	-15.00	10.00
Delta Diablo	3/8/92		9.000	-0.50	1.00	6.00	81.00	19.00	0.500	-2.50	6.00	-5.00	180.00
Delta Diablo	9/20/92		7.100	-0.50	1.00	8.00	91.00	30.00	1.100	3.70	4.00	-5.00	210.00
Delta Diablo	3/10/91		1.200	-0.20	-1.00	10.00	92.00	20.00	0.240	-4.00	2.00	0.90	220.00
Delta Diablo	9/15/91		0.660	-0.50	1.00	7.00	90.00	3.00	1.800	9.40	4.00	2.00	180.00
Delta Diablo	3/11/90		1.300	-0.20	2.00	10.00	110.00	35.00	0.210	6.00	7.00	0.80	220.00
Delta Diablo	9/9/90		1.200	-0.20	2.00	9.00	95.00	34.00	0.300	-4.00	5.00	0.60	200.00
Delta Diablo	3/12/89		1.200	-999.00	3.00	-888.00	100.00	38.00	0.460	-888.00	7.00	1.00	320.00
Delta Diablo	9/10/89		0.800	-0.20	3.00	-888.00	120.00	51.00	0.480	-888.00	7.00	-0.40	300.00
Delta Diablo	3/4/93	wet	-10.000	-1.00	-2.50	5.60	76.00	15.00	0.340	2.70	5.00	-15.00	170.00
Delta Diablo	3/11/93	wet	-10.000	-1.00	-2.50	5.60	85.00	20.00	0.410	2.90	5.00	-15.00	178.00
Dublin/San Ramon	01/01/90		0.500	-0.20	-888.00	2.00	31.00	4.00	0.080	-888.00	2.00	-0.20	28.00
Dublin/San Ramon	01/01/91		-0.400	-0.20	-888.00	10.00	59.00	8.00	-0.010	-888.00	3.00	-0.20	53.00
Dublin/San Ramon	01/01/92	wet	-0.400	-0.20	-0.20	1.20	24.90	1.20	0.040	-888.00	-0.20	-0.20	17.70
Dublin/San Ramon	07/01/90		-0.400	-0.20	-888.00	7.00	52.00	6.00	0.090	-888.00	1.00	-0.20	48.00

-888 = NOT ANALYZED; -999 = NOT DETECTED; Other negative numbers are detection limits

CITY NAME	DATE	TYPE	ARSENIC	BERYLLIUM	CADMIUM	CHROM	COPPER	LEAD	MERCURY	MO	NICKEL	SELENIUM	ZINC
Dublin/San Ramon	07/01/91		-0.400	-0.20	-888.00	3.00	44.00	5.00	0.200	-888.00	2.00	-0.20	30.00
Dunsmuir	1/16/91	wet	-888.000	-888.00	0.09	0.90	20.00	2.30	-888.000	-888.00	0.93	-888.00	32.30
EBMUD	01/14/91	dry	1.500	-0.40	18.00	140.00	550.00	150.00	4.000	-888.00	55.00	2.40	1200.00
EBMUD	07/15/91	dry	1.100	-0.30	19.00	180.00	550.00	150.00	5.200	-888.00	52.00	1.40	1400.00
EBMUD	5/25/92	dry	2.500	0.80	18.00	510.00	570.00	140.00	5.800	-888.00	68.00	-999.00	1300.00
EBMUD	7/13/92	dry	-999.000	-999.00	18.00	230.00	510.00	100.00	-999.000	-888.00	60.00	-999.00	1100.00
EBMUD	7/7/89	wet	0.810	-888.00	4.00	26.00	114.00	33.00	1.000	-888.00	8.40	0.20	286.00
EBMUD	1/15/90	dry	3.700	-999.00	21.00	130.00	490.00	160.00	2.100	-888.00	48.00	1.40	1000.00
EBMUD	7/2/90	dry	-999.000	-999.00	18.00	160.00	610.00	130.00	-999.000	-888.00	52.00	-999.00	1400.00
EBMUD	3/11/93	wet	-10.000	-1.00	2.70	35.00	96.00	29.00	2.500	2.80	19.00	-15.00	190.00
EBMUD	3/23/93	wet	-10.000	-1.00	3.00	36.00	110.00	31.00	3.200	-2.50	16.00	-15.00	200.00
Encina	6/11/90	dry	4.360	0.12	8.62	57.40	654.00	94.00	4.060	-888.00	37.80	7.89	1620.00
Encina	6/10/91	dry	1.550	0.17	10.09	51.10	655.00	90.00	4.360	-888.00	36.80	2.75	1486.00
Encina	6/15/92	dry	5.020	0.07	10.14	44.20	465.00	91.00	3.470	-888.00	43.50	5.11	1520.00
Encina	7/20/92	dry	0.230	-999.00	10.30	43.80	473.00	81.00	6.150	-888.00	45.80	1.48	1880.00
Encina	8/17/92	dry	1.180	-999.00	6.31	35.40	431.00	52.00	3.570	-888.00	38.20	2.48	2090.00
Encina	9/20/92	dry	3.600	-999.00	9.98	39.90	480.00	90.00	4.080	-888.00	37.00	0.87	2061.00
Encina	10/19/92	dry	2.650	0.19	9.42	38.80	430.00	91.00	4.700	-888.00	35.80	1.70	1976.00
Encina	11/25/92	wet	-5.000	0.61	2.10	7.30	37.00	17.00	0.390	-3.00	5.90	2.50	207.00
Encina	5/18/92	wet	-5.000	-0.20	-1.00	1.19	32.00	6.71	0.650	-5.00	-5.00	-5.00	121.00
Encina	2/18/92	wet	-5.000	-0.10	0.51	1.70	27.00	-5.00	0.440	-3.00	-3.00	-2.00	44.00
Encina	8/27/91	wet	-10.000	-0.20	-1.00	6.30	47.00	-10.00	0.290	-5.00	-5.00	-5.00	140.00
Encina	3/12/91	wet	-1.000	-0.15	0.74	6.61	104.00	11.10	0.600	2.43	4.59	-1.00	161.00
Encina	6/11/91	wet	-1.000	-0.25	0.45	11.50	66.30	9.88	0.500	2.83	4.22	1.67	150.00
Encina	8/17/92	wet	-5.000	-0.10	1.09	4.21	39.00	7.95	0.560	-3.00	-3.00	-2.00	72.00
Encina	12/14/92	dry	-888.000	-888.00	-888.00	-888.00	406.00	-888.00	-888.000	14.10	-888.00	-888.00	1120.00
Encina	3/10/93	wet	-10.000	-1.00	-2.50	7.60	96.00	11.80	1.000	3.60	4.60	-15.00	260.00
Encina	3/16/93	wet	-10.000	-1.00	-2.50	6.80	89.00	9.10	0.600	3.00	3.80	-15.00	280.00
Eureka	10/26/89		0.700	-888.00	-999.00	4.00	46.00	8.00	0.200	-888.00	-999.00	-888.00	82.00
Eureka	10/30/91		-999.000	-888.00	-888.00	1.00	14.00	2.00	0.047	-888.00	1.00	-888.00	24.00
Eureka	10/31/91		-888.000	-888.00	-999.00	-888.00	57.00	16.00	-888.000	-888.00	41.00	-888.00	100.00
Eureka	10/31/91		-888.000	-888.00	-999.00	-888.00	110.00	29.00	-888.000	-888.00	-999.00	-888.00	180.00
Eureka	11/19/92		-888.000	-888.00	-999.00	-888.00	23.00	4.00	-888.000	-888.00	-999.00	-888.00	45.00
Eureka	12/20/90		0.024	-888.00	-888.00	-999.00	1.00	0.00	0.014	-888.00	-888.00	-888.00	1.00
Eureka	3/5/93	wet	-10.000	-1.00	-2.50	2.80	43.00	6.00	0.200	-2.50	-2.50	-15.00	65.00
Eureka	3/12/93	wet	-10.000	-1.00	-2.50	7.00	40.00	6.00	0.200	-2.50	4.40	-15.00	65.00
Fallbrook	10/20/92	wet	-999.000	0.11	2.44	6.09	278.00	12.80	0.940	-999.00	4.35	-999.00	220.00
Fallbrook	3/8/93	wet	-10.000	-1.00	-2.50	2.10	100.00	5.00	0.300	-2.50	2.60	-15.00	49.00
Fallbrook	3/15/93	wet	-10.000	-1.00	-2.50	2.90	120.00	4.00	0.200	-2.50	2.60	-15.00	59.00
Fresno	12/16/92	wet	0.100	-888.00	0.08	1.60	6.20	2.00	0.375	-888.00	1.20	0.07	21.00
Fresno		wet	0.077	-888.00	0.11	1.38	3.36	1.60	0.045	0.15	0.89	0.08	16.33
Fresno	3/17/93	wet	-10.000	-1.00	-2.50	7.00	7.10	-5.00	2.300	-2.50	3.00	-15.00	20.00
Fresno	3/24/93	wet	-10.000	-1.00	-2.50	4.00	12.00	-5.00	2.000	-2.50	-2.50	-15.00	28.00
Manteca	03/02/89		0.160	-1.00	-1.00	5.00	52.00	17.00	0.550	-5.00	2.00	0.31	145.00
Manteca	04/02/91		1.600	-1.00	-1.00	3.00	20.00	6.00	-0.200	-5.00	-5.00	-1.00	46.00
Manteca	04/05/90		2.000	-999.00	1.00	4.00	45.00	16.00	0.420	1.10	3.00	-999.00	83.00
Manteca	10/02/89		1.500	-999.00	-999.00	5.00	45.00	13.00	-999.000	-999.00	17.00	-999.00	87.00
Manteca	10/04/90		0.120	-999.00	-999.00	4.00	33.00	3.00	0.370	-999.00	-999.00	0.16	70.00
Manteca	11/07/91		0.371	-0.08	-888.00	2.00	15.00	-4.00	0.124	-888.00	-2.00	-0.12	36.00

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CITY NAME	DATE	TYPE	ARSENIC	BERYLLIUM	CADMIUM	CHROM	COPPER	LEAD	MERCURY	MO	NICKEL	SELENIUM	ZINC
Manteca	11/24/92		4.000	-999.00	-999.00	6.00	46.00	19.00	0.430	-888.00	3.00	103.00	128.00
Manteca	3/4/93	wet	-10.000	-1.00	-2.50	-2.50	6.00	-5.00	0.070	-2.50	-2.50	-15.00	17.00
Manteca	3/11/93	wet	-10.000	-1.00	-2.50	-2.50	6.00	-5.00	0.080	-2.50	-2.50	-15.00	17.00
Modesto	01/15/91		1.200	-888.00	1.00	11.00	43.00	9.00	0.320	-888.00	10.00	0.30	126.00
Modesto	01/21/92		1.000	-888.00	-1.00	10.00	34.00	6.00	-888.000	0.22	6.00	0.27	108.00
Modesto	01/23/90		0.780	-888.00	-888.00	5.00	24.00	5.00	0.250	-888.00	6.00	-0.20	71.00
Modesto	01/25/89		0.320	-888.00	-888.00	3.00	13.00	6.00	0.390	-888.00	5.00	0.04	44.00
Modesto	04/16/91		14.040	-888.00	-888.00	14.00	36.00	5.00	2.430	-888.00	9.00	-0.01	112.00
Modesto	04/17/90		0.700	-888.00	-1.00	8.00	29.00	9.00	0.120	-888.00	8.00	0.28	100.00
Modesto	04/18/89	dry	-0.500	-888.00	-1.00	6.00	19.00	9.00	0.270	-888.00	11.00	0.22	69.00
Modesto	04/18/89	wet	-0.500	-888.00	-1.00	5.00	18.00	9.00	0.260	-888.00	10.00	0.21	66.00
Modesto	07/18/91	dry	8.000	-888.00	3.00	57.00	317.00	80.00	4.500	-888.00	31.00	2.20	1040.00
Modesto	07/19/89		-0.500	-888.00	-1.00	5.00	23.00	9.00	0.087	-888.00	8.00	0.27	73.00
Modesto	07/24/90		0.800	-888.00	1.00	5.00	22.00	6.00	0.290	-888.00	5.00	0.40	70.00
Modesto	10/17/89		0.650	-888.00	-888.00	3.00	16.00	3.00	0.120	-888.00	3.00	0.13	43.00
Modesto	10/17/90	dry	7.000	-888.00	-5.00	88.00	274.00	-50.00	1.900	-888.00	90.00	-2.00	800.00
Modesto	10/17/90		0.700	-888.00	-1.00	8.00	26.00	-5.00	0.180	-888.00	8.00	-0.20	75.00
Modesto	11/10/91		0.053	-888.00	-888.00	5.00	19.00	4.00	0.005	-888.00	3.00	0.06	55.00
Modesto	3/2/93	wet	-10.000	-1.00	-2.50	5.00	23.00	5.70	0.260	-2.50	3.20	-15.00	79.00
Modesto	3/10/93	wet	-10.000	-1.00	-2.50	-2.50	2.80	-5.00	-0.050	-2.50	-2.50	-15.00	9.20
Monterey	11/04/92		2.800	0.10	2.00	17.00	340.00	30.00	0.160	-888.00	8.00	1.20	690.00
Monterey	3/9/93	wet	-10.000	-1.00	-2.50	2.70	42.00	5.50	0.200	-2.50	-2.50	-15.00	110.00
Monterey	3/16/93	wet	-10.000	-1.00	-2.50	2.80	40.00	5.50	0.200	-2.50	-2.50	-15.00	100.00
Napa	03/02/92	wet	5.300	0.40	2.00	1500.00	120.00	95.00	0.320	2.30	49.00	1.10	330.00
Napa	03/14/90		-888.000	-888.00	-888.00	-888.00	-888.00	-888.00	-888.000	-888.00	-888.00	-888.00	-888.00
Napa	03/15/89	wet	0.400	-0.20	-888.00	76.00	26.00	29.00	0.320	3.00	6.00	0.40	68.00
Napa	03/15/91	wet	0.260	-0.08	-888.00	13.00	28.00	25.00	0.410	-0.10	2.00	0.20	77.00
Napa	09/01/92	wet	0.040	0.27	3.00	730.00	120.00	92.00	0.060	-10.00	75.00	0.56	340.00
Napa	09/04/91	wet	5.400	0.25	1.00	580.00	100.00	93.00	0.520	3.00	36.00	0.68	270.00
Napa	09/11/90	wet	2.900	0.16	1.00	260.00	110.00	87.00	0.630	2.00	23.00	0.82	220.00
Napa	09/27/89	wet	3.300	0.25	3.00	1300.00	190.00	270.00	0.700	17.00	25.00	0.23	880.00
Orange Cnty 1	1/0/89	dry	3.900	-888.00	25.00	350.00	1600.00	230.00	8.000	-888.00	230.00	4.80	910.00
Orange Cnty 1	2/0/89	dry	4.400	-888.00	28.00	350.00	1590.00	240.00	-888.000	-888.00	240.00	1.20	930.00
Orange Cnty 1	3/0/89	dry	4.000	-888.00	27.00	270.00	1430.00	190.00	-888.000	-888.00	220.00	1.40	1060.00
Orange Cnty 1	4/0/89	dry	3.400	-888.00	27.00	250.00	1450.00	210.00	0.160	-888.00	230.00	4.70	980.00
Orange Cnty 1	5/0/89	dry	2.700	-888.00	36.00	350.00	1490.00	220.00	-888.000	-888.00	230.00	3.00	1070.00
Orange Cnty 1	6/0/89	dry	2.400	-888.00	28.00	280.00	1420.00	200.00	-888.000	-888.00	240.00	5.30	980.00
Orange Cnty 1	7/0/89	dry	3.100	-888.00	36.00	240.00	1240.00	188.00	4.100	-888.00	180.00	3.20	650.00
Orange Cnty 1	8/0/89	dry	4.100	-888.00	27.00	110.00	1440.00	210.00	-888.000	-888.00	180.00	3.30	1020.00
Orange Cnty 1	9/0/89	dry	3.200	-888.00	30.00	230.00	1740.00	180.00	-888.000	-888.00	170.00	1.80	1010.00
Orange Cnty 1	10/0/89	dry	4.900	-888.00	26.00	280.00	1390.00	190.00	3.400	-888.00	200.00	3.20	1060.00
Orange Cnty 1	11/0/89	dry	4.400	-888.00	22.00	260.00	1290.00	130.00	-999.000	-888.00	160.00	4.40	920.00
Orange Cnty 1	12/0/89	dry	4.600	-888.00	18.00	240.00	1280.00	150.00	-888.000	-888.00	150.00	2.70	840.00
Orange Cnty 2	1/0/89	dry	5.500	7.00	20.00	210.00	855.00	120.00	3.200	-888.00	90.00	1.60	720.00
Orange Cnty 2	2/0/89	dry	7.300	-888.00	33.00	280.00	1020.00	150.00	-888.000	-888.00	120.00	1.60	900.00
Orange Cnty 2	3/0/89	dry	7.400	-888.00	33.00	300.00	1190.00	170.00	-888.000	-888.00	110.00	2.10	1040.00
Orange Cnty 2	4/0/89	dry	5.200	-999.00	29.00	270.00	1240.00	170.00	5.300	-888.00	100.00	4.50	980.00
Orange Cnty 2	5/0/89	dry	4.700	-888.00	30.00	260.00	1170.00	150.00	-888.000	-888.00	150.00	4.10	1030.00
Orange Cnty 2	6/0/89	dry	3.000	-888.00	22.00	230.00	1050.00	140.00	-888.000	-888.00	96.00	2.30	900.00

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Orange Cnty 2	7/0/89	dry	4.500	-999.00	30.00	180.00	1020.00	150.00	11.300	-888.00	120.00	3.50	920.00
Orange Cnty 2	8/0/89	dry	3.300	-888.00	21.00	190.00	1020.00	140.00	-888.000	-888.00	110.00	2.80	1000.00
Orange Cnty 2	9/0/89	dry	3.500	-888.00	29.00	220.00	1070.00	170.00	-888.000	-888.00	97.00	2.30	1020.00
Orange Cnty 2	10/0/89	dry	5.400	-999.00	22.00	260.00	1030.00	170.00	4.800	-888.00	100.00	3.10	1050.00
Orange Cnty 2	11/0/89	dry	5.100	0.21	19.00	190.00	1000.00	150.00	-999.000	-888.00	96.00	3.90	932.00
Orange Cnty 2	12/0/89	dry	4.600	-888.00	25.00	160.00	950.00	140.00	-888.000	-888.00	87.00	2.60	1000.00
Orange Cnty 1	1/0/90	dry	4.200	-999.00	15.00	200.00	1140.00	160.00	4.000	-888.00	120.00	1.90	800.00
Orange Cnty 1	2/0/90	dry	4.200	0.39	18.00	200.00	1180.00	120.00	1.700	-888.00	150.00	4.90	920.00
Orange Cnty 1	3/0/90	dry	4.900	-888.00	20.00	230.00	1190.00	170.00	-888.000	-888.00	180.00	1.80	950.00
Orange Cnty 1	4/0/90	dry	4.600	-999.00	19.00	220.00	1130.00	160.00	5.300	-888.00	210.00	2.00	810.00
Orange Cnty 1	5/0/90	dry	4.400	0.43	25.00	220.00	1120.00	150.00	2.800	-888.00	190.00	5.00	890.00
Orange Cnty 1	6/0/90	dry	4.000	-888.00	28.00	260.00	1310.00	190.00	-888.000	-888.00	200.00	2.10	1100.00
Orange Cnty 1	7/0/90	dry	3.800	-999.00	24.50	190.00	1390.00	160.00	5.400	-888.00	180.00	37.00	830.00
Orange Cnty 1	8/0/90	dry	3.500	-999.00	40.00	260.00	2110.00	240.00	3.900	-888.00	210.00	15.00	1100.00
Orange Cnty 1	9/0/90	dry	-888.000	-888.00	-888.00	-888.00	-888.00	-888.00	-888.000	-888.00	-888.00	-888.00	-888.00
Orange Cnty 1	10/0/90	dry	5.400	-999.00	28.00	220.00	1200.00	190.00	2.700	-888.00	210.00	3.00	1110.00
Orange Cnty 1	11/0/90	dry	4.600	-999.00	29.00	230.00	1220.00	170.00	-999.000	-888.00	210.00	6.90	1060.00
Orange Cnty 1	12/0/90	dry	4.500	-888.00	28.00	310.00	1110.00	160.00	-888.000	-888.00	200.00	2.80	1090.00
Orange Cnty 2	1/0/90	dry	4.700	-999.00	22.00	130.00	890.00	120.00	3.800	-888.00	59.00	2.00	830.00
Orange Cnty 2	2/0/90	dry	4.400	0.38	40.00	160.00	1040.00	120.00	2.700	-888.00	90.00	3.40	1000.00
Orange Cnty 2	3/0/90	dry	5.000	-888.00	23.00	150.00	970.00	110.00	-888.000	-888.00	87.00	2.00	940.00
Orange Cnty 2	4/0/90	dry	5.100	-999.00	22.00	150.00	980.00	150.00	4.400	-888.00	110.00	2.20	880.00
Orange Cnty 2	5/0/90	dry	6.200	0.29	24.00	150.00	1040.00	130.00	2.700	-888.00	100.00	4.40	940.00
Orange Cnty 2	6/0/90	dry	5.000	-888.00	21.00	140.00	970.00	130.00	-888.000	-888.00	90.00	2.30	860.00
Orange Cnty 2	7/0/90	dry	4.800	-999.00	16.10	140.00	960.00	140.00	4.400	-888.00	78.00	48.00	780.00
Orange Cnty 2	8/0/90	dry	5.200	-999.00	20.00	140.00	1140.00	160.00	2.300	-888.00	120.00	5.90	960.00
Orange Cnty 2	9/0/90	dry	-888.000	-888.00	-888.00	-888.00	-888.00	-888.00	-888.000	-888.00	-888.00	-888.00	-888.00
Orange Cnty 2	10/0/90	dry	6.500	-999.00	19.00	150.00	980.00	130.00	-999.000	-888.00	80.00	3.10	850.00
Orange Cnty 2	11/0/90	dry	7.000	-999.00	21.00	130.00	1030.00	130.00	-999.000	-888.00	90.00	4.00	890.00
Orange Cnty 2	12/0/90	dry	5.800	-888.00	35.00	210.00	1040.00	130.00	-888.000	-888.00	100.00	2.60	1440.00
Orange Cnty 1	1/0/91	dry	4.900	-999.00	18.00	260.00	840.00	130.00	2.200	-888.00	160.00	2.50	900.00
Orange Cnty 1	2/0/91	dry	1.900	0.82	23.00	300.00	1180.00	260.00	-999.000	-888.00	210.00	6.30	1220.00
Orange Cnty 1	3/0/91	dry	4.400	-888.00	28.00	280.00	1260.00	240.00	-888.000	-888.00	190.00	2.40	1070.00
Orange Cnty 1	4/0/91	dry	4.000	-999.00	31.00	240.00	1170.00	230.00	3.000	-888.00	190.00	2.50	950.00
Orange Cnty 1	5/0/91	dry	4.400	0.94	30.00	190.00	1170.00	210.00	-999.000	-888.00	220.00	5.60	1000.00
Orange Cnty 1	6/0/91	dry	4.400	-888.00	23.00	140.00	1220.00	210.00	-888.000	-888.00	180.00	3.20	920.00
Orange Cnty 1	7/0/91	dry	-999.000	-999.00	19.00	210.00	1270.00	160.00	2.600	-888.00	200.00	-999.00	910.00
Orange Cnty 1	8/0/91	dry	-888.000	-888.00	32.00	250.00	1400.00	220.00	-888.000	-888.00	280.00	-888.00	1280.00
Orange Cnty 1	9/0/91	dry	4.700	0.63	27.00	220.00	1000.00	130.00	-999.000	-888.00	160.00	7.40	950.00
Orange Cnty 1	10/0/91	dry	-53.000	-2.60	30.00	490.00	1380.00	200.00	3.100	-888.00	260.00	-26.00	1370.00
Orange Cnty 1	11/0/91	dry	-888.000	-888.00	48.00	480.00	1310.00	190.00	-888.000	-888.00	290.00	-888.00	1470.00
Orange Cnty 1	12/0/91	dry	5.600	0.17	28.00	310.00	1110.00	160.00	-0.200	21.00	200.00	4.40	1090.00
Orange Cnty 2	1/0/91	dry	5.000	-999.00	30.00	160.00	890.00	120.00	3.300	-888.00	83.00	2.40	1140.00
Orange Cnty 2	2/0/91	dry	5.200	0.27	21.00	130.00	820.00	110.00	1.400	-888.00	82.00	4.90	880.00
Orange Cnty 2	3/0/91	dry	4.000	-888.00	20.00	120.00	840.00	110.00	-888.000	-888.00	82.00	2.30	920.00
Orange Cnty 2	4/0/91	dry	3.800	-999.00	24.00	130.00	740.00	110.00	4.300	-888.00	74.00	2.60	810.00
Orange Cnty 2	5/0/91	dry	5.000	0.50	27.00	120.00	880.00	120.00	-999.000	-888.00	100.00	4.70	960.00
Orange Cnty 2	6/0/91	dry	4.800	-888.00	23.00	100.00	790.00	120.00	-888.000	-888.00	81.00	3.10	850.00
Orange Cnty 2	7/0/91	dry	-999.000	-999.00	20.00	144.00	960.00	130.00	3.900	-888.00	89.00	-999.00	920.00

-888 = NOT ANALYZED; -999 = NOT DETECTED; Other negative numbers are detection limits

CITY NAME	DATE	TYPE	ARSENIC	BERYLLIUM	CADMIUM	CHROM	COPPER	LEAD	MERCURY	MO	NICKEL	SELENIUM	ZINC
Orange Cnty 2	8/0/91	dry	-888.000	-888.00	19.00	130.00	1030.00	140.00	-888.000	-888.00	110.00	-888.00	1110.00
Orange Cnty 2	9/0/91	dry	7.300	0.36	30.00	110.00	870.00	110.00	-999.000	-888.00	38.00	7.70	910.00
Orange Cnty 2	10/0/91	dry	-46.000	-2.30	21.00	200.00	784.00	120.00	2.700	-888.00	86.00	-23.00	860.00
Orange Cnty 2	11/0/91	dry	-888.000	-888.00	-888.00	320.00	1020.00	140.00	-888.000	-888.00	100.00	-888.00	1200.00
Orange Cnty 2	12/0/91	dry	7.400	0.78	20.00	210.00	1040.00	130.00	-0.200	19.00	100.00	6.40	1440.00
Orange Cnty 1	1/0/92	dry	-53.000	-2.50	17.40	282.00	737.00	125.00	3.200	-888.00	154.00	-26.00	797.00
Orange Cnty 1	2/0/92	dry	7.900	1.00	29.70	227.00	1070.00	113.00	-1.100	19.00	172.00	6.80	1130.00
Orange Cnty 1	3/0/92	dry	-888.000	-888.00	31.10	308.00	1170.00	136.00	-888.000	-888.00	222.00	-888.00	1330.00
Orange Cnty 1	4/0/92	dry	-53.000	-2.60	15.70	265.00	708.00	118.00	3.200	-888.00	146.00	-26.30	760.00
Orange Cnty 1	5/0/92	dry	4.700	2.84	23.00	136.00	1220.00	213.00	-5.300	24.70	184.00	8.40	920.00
Orange Cnty 1	6/0/92	dry	-888.000	-888.00	33.00	260.00	1110.00	232.00	-888.000	-888.00	149.00	-888.00	1100.00
Orange Cnty 1	7/0/92	dry	-59.000	-3.00	42.10	233.00	766.00	173.00	-888.000	-888.00	127.00	-29.50	850.00
Orange Cnty 1	8/0/92	dry	-888.000	-888.00	34.90	229.00	928.00	166.00	-888.000	-888.00	137.00	-888.00	986.00
Orange Cnty 1	9/0/92	dry	-45.000	-2.30	32.20	211.00	1142.00	167.00	0.640	-888.00	141.00	-23.00	1082.00
Orange Cnty 1	10/13/92	wet	-10.000	-0.50	5.60	29.00	200.00	30.00	-0.020	-888.00	32.00	-5.00	170.00
Orange Cnty 2	1/0/92	dry	-48.000	-2.40	36.00	176.00	1050.00	137.00	8.600	-888.00	96.30	-24.00	1370.00
Orange Cnty 2	2/0/92	dry	6.800	0.77	16.10	114.00	830.00	117.00	-0.900	17.00	107.00	3.60	900.00
Orange Cnty 2	3/0/92	dry	-888.000	-888.00	16.90	129.00	813.00	114.00	-888.000	-888.00	119.00	-888.00	960.00
Orange Cnty 2	4/0/92	dry	-50.000	-2.50	23.90	202.00	783.00	116.00	3.700	-888.00	110.00	-25.00	954.00
Orange Cnty 2	5/0/92	dry	7.700	2.14	23.40	104.00	790.00	116.00	1.800	50.00	80.60	7.70	950.00
Orange Cnty 2	6/0/92	dry	-888.000	-888.00	24.70	138.00	830.00	127.00	-888.000	-888.00	144.00	-888.00	1030.00
Orange Cnty 2	7/0/92	dry	-45.000	-2.20	24.90	169.00	695.00	104.00	-888.000	-888.00	122.00	-22.50	896.00
Orange Cnty 2	8/0/92	dry	-888.000	-888.00	16.90	100.00	556.00	58.50	-888.000	-888.00	75.10	-888.00	697.00
Orange Cnty 2	9/0/92	dry	-45.000	-2.30	35.50	100.00	710.00	95.50	0.450	-888.00	85.70	-23.00	911.00
Orange Cnty 2	10/13/92	wet	-10.000	-0.50	6.60	25.00	190.00	23.00	-0.020	-888.00	26.00	-5.00	220.00
Orange Cnty	3/23/93	wet	-10.000	-1.00	4.20	25.00	180.00	21.00	2.300	4.50	23.00	-15.00	140.00
Orange Cnty	3/23/93	wet	-10.000	-1.00	5.70	25.00	160.00	28.00	1.800	4.90	23.00	-15.00	200.00
Oroville	08/25/92		0.880	0.20	5.00	43.90	247.00	128.00	0.189	8.40	36.50	0.67	895.00
Palo Alto	09/23/92	wet	-999.000	-999.00	1.30	6.00	120.00	22.00	2.300	400.00	5.00	-999.00	210.00
Palo Alto	3/17/93	wet	-10.000	-1.00	-2.50	7.50	110.00	33.00	0.700	-2.50	11.00	-15.00	178.00
Palo Alto	3/17/93	wet	-10.000	-1.00	-2.50	8.00	103.00	30.00	0.600	2.50	10.00	-15.00	170.00
Redding - CC			30.000	-999.00	11.00	-888.00	200.00	23.00	0.440	5.20	11.00	-999.00	290.00
Redding - SW			11.000	-999.00	2.00	-888.00	82.00	6.00	0.290	-999.00	7.00	-999.00	120.00
Redding - CC			3.400	-0.20	12.00	37.00	169.00	67.00	1.200	-888.00	20.00	-2.00	310.00
Redding	01/02/91		5.100	-0.20	16.00	16.00	140.00	55.00	0.410	-4.00	12.00	1.10	370.00
Redding - CC	06/12/05	wet	5.100	-888.00	16.00	16.00	140.00	55.00	0.410	-888.00	12.00	1.10	370.00
Redding - CC	06/13/05	wet	-10.000	-5.00	-5.00	-10.00	140.00	640.00	2.100	-888.00	-25.00	0.92	470.00
Redding - CC	06/25/92		98.000	-999.00	33.00	-888.00	140.00	22.00	0.830	4.10	12.00	-999.00	290.00
Redding - CC	08/28/89		3.800	0.49	7.00	24.00	169.00	45.00	1.400	-1.80	16.00	4.60	398.00
Redding - CC	12/18/90		-888.000	-888.00	-888.00	-888.00	-888.00	-888.00	-888.000	-888.00	-888.00	-888.00	-888.00
Redding	12/23/91		-999.000	-999.00	-999.00	-999.00	140.00	640.00	2.100	-888.00	-999.00	0.92	470.00
Redding	3/3/93	wet	-10.000	-1.00	5.80	10.00	58.00	5.40	0.260	-2.50	7.70	-15.00	80.00
Redding	3/10/93	wet	-10.000	-1.00	4.90	10.00	61.00	-5.00	0.180	-2.50	8.20	-15.00	80.00
Rialto	3/1/92		-999.000	-999.00	-999.00	-999.00	82.00	-999.00	-999.000	-888.00	-999.00	-999.00	220.00
Rialto	6/1/92		-999.000	-999.00	-999.00	-999.00	74.00	12.00	0.600	-888.00	-999.00	-999.00	130.00
Rialto	9/1/92		-999.000	-999.00	-999.00	35.00	420.00	61.00	2.000	-888.00	27.00	-999.00	810.00
Rialto	12/1/92		-999.000	-999.00	-999.00	-999.00	77.00	-999.00	-999.000	-888.00	-999.00	-999.00	120.00
Rialto	3/19/93	wet	-10.000	-1.00	-2.50	7.70	65.00	7.90	0.400	-2.50	3.40	-15.00	120.00
Rialto	3/22/93	wet	-10.000	-1.00	-2.50	6.80	74.00	7.20	0.300	3.10	2.70	-15.00	120.00

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CITY NAME	DATE	TYPE	ARSENIC	BERYLLIUM	CADMIUM	CHROM	COPPER	LEAD	MERCURY	MO	NICKEL	SELENIUM	ZINC
Riverside	06/12/05		-888.000	-888.00	-888.00	2.00	14.00	4.00	-999.000	-888.00	-888.00	-888.00	17.00
Riverside	6/25/92	wet	-999.000	-999.00	-999.00	38.00	420.00	49.00	1.900	-888.00	14.00	-999.00	560.00
Riverside	7/20/92	dry	-999.000	-999.00	-999.00	53.00	770.00	70.00	2.500	-888.00	24.00	-999.00	950.00
Riverside	7/20/92	dry	-999.000	-999.00	-999.00	55.00	720.00	65.00	2.500	-888.00	25.00	-999.00	825.00
Riverside	7/20/92	dry	-999.000	-999.00	-999.00	58.00	810.00	72.00	2.300	-888.00	19.00	-999.00	970.00
Riverside	7/20/92	dry	-999.000	-999.00	-999.00	57.00	880.00	76.00	2.100	-888.00	21.00	-999.00	1040.00
Riverside	7/20/92	dry	-999.000	-999.00	-999.00	57.00	870.00	83.00	2.500	-888.00	22.00	-999.00	1100.00
Riverside	12/4/92	dry	3.500	-999.00	2.80	56.00	650.00	7.20	-999.000	-888.00	21.00	3.30	780.00
Riverside	3/8/93	wet	-10.000	-1.00	4.40	60.00	750.00	61.00	1.800	12.00	18.00	-15.00	850.00
Riverside	3/15/93	wet	-10.000	-1.00	2.90	40.00	520.00	43.00	2.100	5.30	13.30	-15.00	580.00
Running Springs	02/06/91		-999.000	-999.00	-999.00	15.00	140.00	20.00	0.800	-999.00	10.00	-999.00	340.00
Sacto Regional	06/13/05	wet	0.770	-888.00	-888.00	2.00	8.00	3.00	0.089	-888.00	1.00	0.15	13.00
Sacto Regional	3/22/89	dry	-888.000	-888.00	8.80	95.00	-888.00	170.00	4.000	-888.00	-888.00	2.00	670.00
Sacto Regional	4/9/90	dry	-170.000	-888.00	6.60	46.00	330.00	60.00	-888.000	-888.00	140.00	-83.00	370.00
Sacto Regional	8/8/90	dry	-59.000	-888.00	4.20	40.00	240.00	52.00	2.800	-888.00	-888.00	-29.00	460.00
Sacto Regional	10/18/90	dry	-12.000	-888.00	4.20	48.00	260.00	69.00	-30.000	-888.00	22.00	-3.00	570.00
Sacto Regional	1/24/91	dry	3.000	-888.00	7.50	95.00	750.00	135.00	11.000	-888.00	42.00	6.50	2400.00
Sacto Regional	4/10/91	dry	-50.000	-888.00	4.10	48.00	240.00	96.00	-2.500	-888.00	16.00	-25.00	670.00
Sacto Regional	7/10/91	dry	-50.000	-888.00	7.30	61.00	430.00	120.00	3.000	-888.00	16.00	-25.00	790.00
Sacto Regional	11/1/91	dry	-25.000	-888.00	9.50	134.00	671.00	190.00	4.200	-888.00	43.00	-12.00	1200.00
Sacto Regional	3/10/93	wet	-10.000	-1.00	-2.50	2.60	6.20	-5.00	-0.050	-2.50	-2.50	-15.00	13.00
Sacto Regional	3/17/93	wet	-10.000	-1.00	-2.50	2.80	6.40	-5.00	-0.050	-2.50	-2.50	-15.00	13.00
San Diego	1989avg	dry	6.000	-888.00	6.00	121.00	356.00	82.00	2.400	-888.00	76.00	0.80	458.00
San Diego	1990avg	dry	6.000	-888.00	3.00	103.00	284.00	59.00	2.300	-888.00	46.00	1.10	514.00
San Diego	1/5/89	dry	5.000	-888.00	7.00	140.00	360.00	110.00	2.600	-888.00	87.00	-0.20	480.00
San Diego	1/5/89	dry	5.000	-5.00	7.00	140.00	360.00	110.00	2.600	-100.00	90.00	-0.20	480.00
San Diego	1/5/89	dry	4.400	-888.00	7.00	130.00	350.00	200.00	2.600	-100.00	98.00	-0.20	450.00
San Diego	2/3/89	dry	5.000	-888.00	7.00	160.00	340.00	100.00	3.100	-888.00	100.00	-0.20	440.00
San Diego	3/10/89	dry	8.000	-888.00	-10.00	110.00	400.00	-100.00	2.300	-888.00	80.00	1.80	540.00
San Diego	4/10/89	dry	7.000	-888.00	10.00	150.00	400.00	130.00	2.000	-888.00	83.00	1.80	530.00
San Diego	5/17/89	dry	4.000	-888.00	6.00	110.00	340.00	69.00	1.000	-888.00	70.00	0.60	420.00
San Diego	5/17/89	dry	4.400	-888.00	8.00	130.00	360.00	84.00	5.300	-100.00	76.00	-888.00	460.00
San Diego	5/17/89	dry	4.700	-888.00	6.00	110.00	340.00	69.00	1.000	-100.00	70.00	-888.00	460.00
San Diego	6/7/89	dry	5.000	-888.00	6.00	130.00	360.00	76.00	2.900	-888.00	69.00	0.40	430.00
San Diego	7/1/89	dry	4.100	-888.00	7.00	94.00	320.00	75.00	2.000	-150.00	65.00	0.10	420.00
San Diego	7/19/89	dry	6.000	-888.00	7.00	130.00	380.00	93.00	1.800	-888.00	80.00	0.10	480.00
San Diego	7/19/89	dry	5.500	-888.00	7.00	130.00	380.00	93.00	1.800	-15.00	80.00	0.10	480.00
San Diego	7/19/89	dry	5.800	-888.00	9.00	110.00	310.00	77.00	1.500	14.00	62.00	0.20	400.00
San Diego	7/19/89	dry	3.600	-888.00	5.00	72.00	280.00	65.00	1.200	-150.00	56.00	0.20	390.00
San Diego	8/24/89	dry	6.000	-888.00	7.00	170.00	410.00	110.00	4.800	-888.00	77.00	-0.10	520.00
San Diego	9/20/89	dry	7.000	-888.00	5.00	140.00	340.00	85.00	3.200	-888.00	67.00	-0.10	440.00
San Diego	9/22/89	dry	7.200	-5.00	5.00	140.00	340.00	85.00	3.200	15.00	67.00	-0.10	440.00
San Diego	10/5/89	dry	5.000	-888.00	8.00	110.00	320.00	68.00	2.400	-888.00	76.00	2.60	420.00
San Diego	11/28/89	dry	4.000	-888.00	-5.00	-50.00	230.00	53.00	1.200	-888.00	46.00	1.30	300.00
San Diego	12/12/89	dry	5.000	-888.00	6.00	99.00	390.00	90.00	1.900	-888.00	71.00	1.50	490.00
San Diego	12/20/89	dry	5.000	-888.00	6.00	105.00	290.00	84.00	2.000	-888.00	40.00	0.80	400.00
San Diego	1/10/90	dry	4.600	6.00	6.00	105.00	290.00	84.00	2.000	-15.00	40.00	0.80	400.00
San Diego	1/10/90	dry	4.400	7.00	4.00	90.00	270.00	77.00	1.500	-15.00	49.00	0.70	390.00
San Diego	2/14/90	dry	7.000	-888.00	5.00	117.00	319.00	74.00	3.100	-888.00	44.00	1.30	611.00

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CITY NAME	DATE	TYPE	ARSENIC	BERYLLIUM	CADMIUM	CHROM	COPPER	LEAD	MERCURY	MO	NICKEL	SELENIUM	ZINC
San Diego	2/14/90	dry	6.600	-0.50	5.20	117.00	322.00	74.00	3.100	-15.00	44.00	1.30	611.00
San Diego	4/12/90	dry	6.000	-888.00	5.00	82.00	290.00	67.00	2.000	-888.00	44.00	0.70	660.00
San Diego	4/12/90	dry	6.100	0.50	4.60	82.00	290.00	67.00	2.000	-15.00	4.40	0.70	660.00
San Diego	5/30/90	dry	6.000	-888.00	4.00	112.00	248.00	56.00	2.400	-888.00	48.00	0.80	575.00
San Diego	5/30/90	dry	5.500	-0.50	4.20	112.00	248.00	55.00	2.400	-15.00	48.00	0.82	575.00
San Diego	6/27/90	dry	7.100	-0.50	12.00	240.00	680.00	175.00	3.600	-15.00	108.00	1.80	795.00
San Diego	6/27/90	dry	4.200	-0.50	18.00	140.00	500.00	150.00	3.300	-15.00	120.00	1.10	640.00
San Diego	9/5/90	dry	7.000	-888.00	-5.00	117.00	294.00	58.00	2.400	-888.00	48.00	1.40	440.00
San Diego	9/5/90	dry	6.700	-999.00	-999.00	117.00	294.00	58.00	2.400	-999.00	48.00	1.40	44.00
San Diego	9/5/90	dry	6.700	-999.00	-999.00	117.00	294.00	58.00	2.400	-15.00	48.00	1.40	440.00
San Diego	11/6/90	dry	5.000	-888.00	-5.00	105.00	264.00	75.00	1.900	-888.00	59.00	1.30	499.00
San Diego	11/6/90	dry	5.100	-999.00	-999.00	105.00	264.00	75.00	1.800	-15.00	59.00	1.30	499.00
San Diego	12/12/90	dry	6.000	-888.00	-5.00	82.00	280.00	-50.00	2.000	-888.00	40.00	1.40	410.00
San Diego	12/12/90	dry	5.900	-0.50	4.40	127.00	280.00	44.00	2.000	-15.00	-40.00	1.40	410.00
San Diego	1/15/91	dry	7.600	-888.00	7.00	114.00	327.00	72.00	2.200	-888.00	49.00	1.90	590.00
San Diego	1/15/91	dry	7.000	-888.00	10.00	124.00	323.00	54.00	2.400	-888.00	48.00	1.60	475.00
San Diego	1/15/91	dry	7.000	-5.00	10.00	125.00	320.00	54.00	2.400	-999.00	48.00	1.60	470.00
San Diego	3/7/91	dry	5.000	-2.00	10.00	227.00	620.00	181.00	3.500	-999.00	80.00	1.00	861.00
San Diego	3/7/91	dry	5.000	-2.00	10.00	245.00	572.00	177.00	2.900	-999.00	76.00	0.90	790.00
San Diego	4/8/91	dry	5.000	-888.00	-999.00	90.00	260.00	52.00	1.900	-888.00	36.00	0.90	396.00
San Diego	4/8/91	dry	5.000	-5.00	-5.00	90.00	260.00	52.00	1.900	-999.00	36.00	0.90	396.00
San Diego	6/26/91	dry	6.200	-888.00	3.90	75.00	265.00	51.00	1.500	-888.00	56.00	-999.00	390.00
San Diego	6/26/91	dry	6.200	0.63	3.90	75.00	265.00	51.00	1.500	-999.00	56.00	-0.10	390.00
San Diego	8/22/91	dry	6.700	-888.00	7.60	66.00	329.00	70.00	2.000	-888.00	43.00	1.80	450.00
San Diego	8/22/91	dry	6.700	-999.00	8.00	66.00	329.00	-999.00	2.000	-999.00	-999.00	1.80	450.00
San Diego	8/22/91	dry	6.700	-5.00	7.60	65.00	329.00	55.00	1.900	-999.00	-40.00	1.80	450.00
San Diego	10/28/91	dry	5.900	-888.00	5.90	89.00	386.00	72.00	2.300	-888.00	47.00	1.40	599.00
San Diego	10/28/91	dry	7.300	-888.00	6.70	85.00	392.00	69.00	2.500	-888.00	52.00	1.10	666.00
San Diego	10/28/91	dry	5.870	-5.00	5.90	89.00	386.00	72.00	2.300	-999.00	47.40	1.40	599.00
San Diego	10/28/91	dry	7.250	-5.00	6.70	85.00	392.00	69.00	2.500	-999.00	51.70	1.10	666.00
San Diego	3/12/93	wet	-10.000	-1.00	-2.50	77.00	140.00	22.00	1.100	8.00	33.00	-15.00	210.00
San Diego	3/19/93	wet	-10.000	-1.00	-2.50	17.00	59.00	11.00	0.700	3.50	8.70	-15.00	91.00
San Jose	3/10/93	wet	-10.000	-1.00	2.80	77.00	240.00	54.00	0.850	4.50	85.00	-15.00	540.00
San Jose	3/10/93	wet	12.000	-1.00	4.50	92.00	250.00	92.00	0.920	3.00	110.00	-15.00	410.00
San Jose	11/24/86		-888.000	-888.00	-888.00	-888.00	-888.00	-888.00	-888.000	-888.00	-888.00	-888.00	-888.00
San Jose	9/30/88		-888.000	-888.00	-888.00	-888.00	-888.00	-888.00	-888.000	-888.00	-888.00	-888.00	-888.00
San Jose	8/30/91		-888.000	-888.00	-888.00	-888.00	-888.00	-888.00	-888.000	-888.00	-888.00	-888.00	-888.00
San Luis Obispo	3/16/93	wet	-10.000	-1.00	2.90	73.00	450.00	120.00	4.700	4.60	92.00	-15.00	590.00
San Luis Obispo	10/01/91		28.000	-0.50	7.00	57.00	1065.00	316.00	9.000	6.00	125.00	3.70	1500.00
Santa Barbara	8/11/92		2.700	-888.00	5.40	94.00	420.00	72.00	0.380	-888.00	36.00	-1.00	560.00
Santa Barbara	12/1/92		3.100	-888.00	6.00	87.20	438.30	65.50	0.500	-888.00	34.20	0.80	705.00
Santa Barbara	1/0/92	dry	3.800	-888.00	6.30	55.00	400.00	94.00	0.560	-888.00	38.00	-888.00	800.00
Santa Barbara	4/0/92	dry	0.100	-888.00	6.40	130.00	410.00	130.00	0.640	-888.00	30.00	-888.00	700.00
Santa Barbara	7/0/92	dry	2.200	-888.00	7.20	100.00	470.00	22.00	0.270	-888.00	34.00	-888.00	600.00
Santa Barbara	1/0/91	dry	-888.000	-888.00	7.60	40.00	635.00	39.00	0.030	-888.00	44.00	-888.00	1580.00
Santa Barbara	4/0/91	dry	2.500	-888.00	6.70	36.00	515.00	147.00	8.700	-888.00	31.00	-888.00	920.00
Santa Barbara	7/0/91	dry	7.600	-888.00	9.00	37.00	600.00	146.00	0.120	-888.00	44.00	-888.00	1000.00
Santa Barbara	1/0/90	dry	19.100	-888.00	6.90	108.00	700.00	206.00	0.770	-888.00	95.00	-888.00	590.00
Santa Barbara	4/0/90	dry	16.000	-888.00	3.00	74.00	517.00	72.00	0.230	-888.00	26.00	-888.00	312.00

-888 = NOT ANALYZED; -999 = NOT DETECTED; Other negative numbers are detection limits

CITY NAME	DATE	TYPE	ARSENIC	BERYLLIUM	CADMIUM	CHROM	COPPER	LEAD	MERCURY	MO	NICKEL	SELENIUM	ZINC
Santa Barbara	7/0/90	dry	20.000	-888.00	7.00	145.00	690.00	108.00	0.680	-888.00	50.00	-888.00	1000.00
Santa Barbara	1/0/89	dry	14.000	-888.00	14.30	220.00	613.00	120.00	1.100	-888.00	41.00	-888.00	840.00
Santa Barbara	4/0/89	dry	18.500	-888.00	45.00	151.00	637.00	136.00	1.000	-888.00	45.00	-888.00	870.00
Santa Barbara	7/0/89	dry	16.500	-888.00	6.20	100.00	700.00	150.00	0.430	-888.00	37.00	-888.00	930.00
Santa Barbara	10/0/89	dry	8.400	-888.00	7.30	83.00	696.00	107.00	2.570	-888.00	95.00	-888.00	1090.00
Santa Barbara	10/0/90	dry	5.400	-888.00	10.00	135.00	625.00	81.30	0.380	-888.00	48.00	-888.00	1100.00
Santa Barbara	10/0/91	dry	18.000	-888.00	2.00	151.00	550.00	31.00	0.230	-888.00	26.00	-888.00	800.00
Santa Barbara	10/0/92	dry	2.100	-888.00	7.10	110.00	710.00	50.00	0.320	-888.00	35.00	-888.00	900.00
Santa Barbara	3/23/92	dry	4.000	-2.00	3.00	27.00	270.00	54.00	0.160	-20.00	23.00	-888.00	500.00
Santa Barbara	3/3/93	wet	-10.000	-1.00	-2.50	8.80	74.00	14.00	0.380	-2.50	4.80	-15.00	140.00
Santa Barbara	3/11/93	wet	-10.000	-1.00	-2.50	7.10	68.00	9.50	0.340	-2.50	5.40	-15.00	120.00
Santa Rosa	10/7/91	wet	0.590	0.17	0.60	5.00	180.00	8.00	0.160	7.00	4.00	-0.05	150.00
Santa Rosa	4/8/91	wet	1.100	-0.10	0.81	10.00	220.00	19.00	0.690	-1.00	8.60	1.40	180.00
Santa Rosa	7/13/92	wet	1.300	-0.08	1.00	7.30	230.00	18.00	0.380	2.00	5.40	0.47	150.00
Santa Rosa	1/11/93	wet	1.900	-1.00	2.30	13.00	270.00	39.00	1.500	-0.80	11.00	0.19	260.00
Santa Rosa	10/7/92	wet	1.400	-0.10	2.00	10.00	270.00	13.00	0.110	1.00	8.20	0.15	50.00
Santa Rosa	3/4/93	wet	-10.000	-1.00	8.60	27.00	360.00	120.00	2.500	-2.50	23.00	-15.00	440.00
Santa Rosa	3/11/93	wet	-10.000	-1.00	3.20	16.00	270.00	57.00	1.200	-2.50	16.00	-15.00	270.00
SouthTahoe	03/09/89		-0.080	-0.20	1.00	-888.00	41.00	10.00	-0.160	0.22	4.00	-0.10	100.00
South Tahoe	3/12/93	wet	-10.000	-1.00	-2.50	2.90	66.00	6.20	0.160	-2.50	-2.50	-15.00	130.00
South Tahoe	3/19/93	wet	-10.000	-1.00	-2.50	-2.50	59.00	5.00	0.160	-2.50	-2.50	-15.00	120.00
Taft	07/20/90		19.000	-0.50	8.00	76.00	550.00	460.00	3.800	22.00	41.00	-0.05	1210.00
Taft	07/20/90		4.900	-0.50	9.00	96.00	640.00	510.00	7.200	22.00	45.00	-0.05	1300.00
Taft	07/20/90		9.600	-0.50	8.00	78.00	540.00	470.00	4.400	21.00	43.00	-0.05	1210.00
Thousand Oaks	3/4/93	wet	-10.000	-1.00	4.70	13.00	260.00	43.00	1.300	5.10	18.00	-15.00	320.00
Thousand Oaks	3/17/93	wet	16.000	-1.00	6.60	19.00	370.00	56.00	2.000	8.00	27.00	-15.00	470.00
Tracy	06/26/91		-888.000	-888.00	3.00	53.00	423.00	67.00	-888.000	-888.00	40.00	-888.00	1280.00
Tracy	07/01/92		-888.000	-888.00	4.00	61.00	337.00	55.00	-888.000	-888.00	55.00	-888.00	1270.00
Tracy	08/17/90		-888.000	-888.00	4.00	-888.00	400.00	103.00	-888.000	-888.00	40.00	-888.00	1200.00
Tracy	08/17/90		-888.000	-888.00	4.00	-888.00	360.00	93.00	-888.000	-888.00	36.00	-888.00	1600.00
Tracy	3/17/93	wet	-10.000	-1.00	-2.50	38.00	210.00	47.00	0.800	10.00	32.00	-15.00	880.00
Tracy	3/17/93	wet	-10.000	-1.00	-2.50	43.00	300.00	65.00	0.400	4.70	28.00	-15.00	1000.00
Vallejo	04/01/90		-888.000	-888.00	1.00	23.00	124.00	40.00	-888.000	-888.00	18.00	-888.00	200.00
Vallejo	06/05/92		0.410	-888.00	1.00	3.00	59.00	13.00	0.380	-1.00	-1.00	0.22	83.00
Vallejo	12/01/89		-888.000	-999.00	2.00	19.00	186.00	50.00	-888.000	-888.00	21.00	-999.00	309.00
Vallejo	12/01/90		4.440	-888.00	1.00	-3.00	222.00	21.00	0.030	-888.00	11.00	1.52	399.00
Vallejo	3/4/93	wet	-10.000	-1.00	-2.50	3.30	46.00	7.30	0.530	-2.50	3.30	-15.00	79.00
Vallejo	3/11/93	wet	-10.000	-1.00	-2.50	2.60	42.00	-5.00	0.210	-2.50	2.60	-15.00	75.00
West Contra Cost	07/31/90	dry	0.190	-0.01	-888.00	2.00	10.00	9.00	0.032	-888.00	1.00	0.01	14.00
West Contra Cost	3/10/93	wet	-10.000	-1.00	-2.50	3.40	24.00	5.90	0.230	-2.50	3.70	-15.00	41.00
West Contra Cost	3/11/93	wet	-10.000	-1.00	-2.50	2.50	11.00	3.00	0.110	-2.50	2.30	-15.00	170.00
West Sacramento	1/17/89	wet	2.100	-0.50	1.30	77.00	200.00	31.00	0.400	3.50	8.50	0.60	190.00
West Sacramento	12/8/89	wet	1.200	-0.50	1.20	24.00	86.00	21.00	0.270	-5.00	6.50	0.80	150.00
West Sacramento	3/15/90	wet	11.000	-0.50	1.80	29.00	170.00	33.00	0.510	-5.00	21.00	0.76	320.00
West Sacramento	7/20/90	wet	2.100	-0.50	1.60	14.00	130.00	26.00	0.680	-5.00	7.80	0.60	340.00
West Sacramento	11/27/90	wet	1.200	0.50	1.80	13.00	120.00	30.00	1.400	-5.00	7.60	-0.50	540.00
West Sacramento	5/8/91	wet	-888.000	-888.00	-888.00	-888.00	-888.00	22.00	-888.000	-888.00	-888.00	-888.00	540.00
West Sacramento	7/17/91	wet	-1.000	-0.50	1.50	10.00	98.00	22.00	0.450	-5.00	5.50	0.80	440.00
West Sacramento	3/5/91	wet	-1.000	-0.50	1.30	9.80	100.00	23.00	0.400	-5.00	5.60	0.90	510.00

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CITY NAME	DATE	TYPE	ARSENIC	BERYLLIUM	CADMIUM	CHROM	COPPER	LEAD	MERCURY	MO	NICKEL	SELENIUM	ZINC
West Sacramento	4/29/91	wet	2.400	-0.50	1.80	20.00	150.00	26.00	0.520	-5.00	7.60	0.70	620.00
West Sacramento	9/11/91	wet	-0.250	-0.50	1.20	9.40	100.00	27.00	0.270	4.80	5.30	-0.25	420.00
West Sacramento	7/20/89	wet	2.000	-0.50	1.80	88.00	160.00	52.00	0.620	-5.00	10.00	0.86	280.00
West Sacramento	3/1/93	wet	-10.000	-1.00	1.20	10.00	85.00	14.00	0.280	2.80	6.90	-15.00	550.00
West Sacramento	3/1/93	wet	-10.000	-1.00	1.10	9.80	86.00	14.00	0.340	2.70	7.20	-15.00	530.00

COUNT:
396

-888 = NOT ANALYZED; -999 = NOT DETECTED; Other negative numbers are detection limits

APPENDIX 2

Database of Part 503 Pollutants

- CIWMB SAMPLES -

(wet weights)

from

'ANALYZE1'

CIWMB SAMPLES - WET WEIGHTS IN MG/KG

CITY NAME	DATE	ARSENIC	BERYLLIUM	CADMIUM	CHROM	COPPER	LEAD	MERCURY	MO	NICKEL	SELENIUM	ZINC
Bakersfield	1/5/93	-10.000	-1.00	-2.50	10.00	54.00	7.40	0.350	-2.50	4.90	-15.00	150.00
Bakersfield	1/5/93	-10.000	-1.00	3.40	42.00	330.00	37.00	1.000	7.60	14.00	-15.00	820.00
CCCSD	3/16/93	-10.000	-1.00	-2.50	6.00	60.00	5.20	1.100	-2.50	4.80	-15.00	75.00
CCCSD	3/23/93	-10.000	-1.00	-2.50	14.00	63.00	-5.00	1.300	-2.50	8.20	-15.00	75.00
Chino Basin	3/5/93	-10.000	-1.00	-2.50	22.00	62.00	11.00	0.420	2.70	14.00	-15.00	130.00
Chino Basin	3/13/93	-10.000	-1.00	-2.50	21.00	62.00	12.00	0.550	-2.50	13.00	-15.00	130.00
Corning	3/22/93	19.000	-1.00	-2.50	24.00	88.00	42.00	0.880	-2.50	10.00	-15.00	300.00
Corning	3/22/93	-10.000	-1.00	-2.50	40.00	5.80	-5.00	-0.050	-2.50	17.00	-15.00	10.00
Delta Diablo	3/4/93	-10.000	-1.00	-2.50	5.60	76.00	15.00	0.340	2.70	5.00	-15.00	170.00
Delta Diablo	3/11/93	-10.000	-1.00	-2.50	5.60	85.00	20.00	0.410	2.90	5.00	-15.00	178.00
EBMUD	3/11/93	-10.000	-1.00	2.70	35.00	96.00	29.00	2.500	2.80	19.00	-15.00	190.00
EBMUD	3/23/93	-10.000	-1.00	3.00	36.00	110.00	31.00	3.200	-2.50	16.00	-15.00	200.00
Encina	3/10/93	-10.000	-1.00	-2.50	7.60	96.00	11.80	1.000	3.60	4.60	-15.00	260.00
Encina	3/16/93	-10.000	-1.00	-2.50	6.80	89.00	9.10	0.600	3.00	3.80	-15.00	280.00
Eureka	3/5/93	-10.000	-1.00	-2.50	2.80	43.00	6.00	0.200	-2.50	-2.50	-15.00	65.00
Eureka	3/12/93	-10.000	-1.00	-2.50	7.00	40.00	6.00	0.200	-2.50	4.40	-15.00	65.00
Fallbrook	3/8/93	-10.000	-1.00	-2.50	2.10	100.00	5.00	0.300	-2.50	2.60	-15.00	49.00
Fallbrook	3/15/93	-10.000	-1.00	-2.50	2.90	120.00	4.00	0.200	-2.50	2.60	-15.00	59.00
Fresno	3/17/93	-10.000	-1.00	-2.50	7.00	7.10	-5.00	2.300	-2.50	3.00	-15.00	20.00
Fresno	3/24/93	-10.000	-1.00	-2.50	4.00	12.00	-5.00	2.000	-2.50	-2.50	-15.00	28.00
Manteca	3/4/93	-10.000	-1.00	-2.50	-2.50	6.00	-5.00	0.070	-2.50	-2.50	-15.00	17.00
Manteca	3/11/93	-10.000	-1.00	-2.50	-2.50	6.00	-5.00	0.080	-2.50	-2.50	-15.00	17.00
Modesto	3/2/93	-10.000	-1.00	-2.50	5.00	23.00	5.70	0.260	-2.50	3.20	-15.00	79.00
Modesto	3/10/93	-10.000	-1.00	-2.50	-2.50	2.80	-5.00	-0.050	-2.50	-2.50	-15.00	9.20
Monterey	3/9/93	-10.000	-1.00	-2.50	2.70	42.00	5.50	0.200	-2.50	-2.50	-15.00	110.00
Monterey	3/16/93	-10.000	-1.00	-2.50	2.80	40.00	5.50	0.200	-2.50	-2.50	-15.00	100.00
Orange Cnty	3/23/93	-10.000	-1.00	4.20	25.00	180.00	21.00	2.300	4.50	23.00	-15.00	140.00
Orange Cnty	3/23/93	-10.000	-1.00	5.70	25.00	160.00	28.00	1.800	4.90	23.00	-15.00	200.00
Palo Alto	3/17/93	-10.000	-1.00	-2.50	7.50	110.00	33.00	0.700	-2.50	11.00	-15.00	178.00
Palo Alto	3/17/93	-10.000	-1.00	-2.50	8.00	103.00	30.00	0.600	2.50	10.00	-15.00	170.00
Redding	3/3/93	-10.000	-1.00	5.80	10.00	58.00	5.40	0.260	-2.50	7.70	-15.00	80.00
Redding	3/10/93	-10.000	-1.00	4.90	10.00	61.00	-5.00	0.180	-2.50	8.20	-15.00	80.00
Rialto	3/19/93	-10.000	-1.00	-2.50	7.70	65.00	7.90	0.400	-2.50	3.40	-15.00	120.00
Rialto	3/22/93	-10.000	-1.00	-2.50	6.80	74.00	7.20	0.300	3.10	2.70	-15.00	120.00
Riverside	3/8/93	-10.000	-1.00	4.40	60.00	750.00	61.00	1.800	12.00	18.00	-15.00	850.00
Riverside	3/15/93	-10.000	-1.00	2.90	40.00	520.00	43.00	2.100	5.30	13.30	-15.00	580.00
Sacto Regional	3/10/93	-10.000	-1.00	-2.50	2.60	6.20	-5.00	-0.050	-2.50	-2.50	-15.00	13.00
Sacto Regional	3/17/93	-10.000	-1.00	-2.50	2.80	6.40	-5.00	-0.050	-2.50	-2.50	-15.00	13.00
San Diego	3/12/93	-10.000	-1.00	-2.50	77.00	140.00	22.00	1.100	8.00	33.00	-15.00	210.00
San Diego	3/19/93	-10.000	-1.00	-2.50	17.00	59.00	11.00	0.700	3.50	8.70	-15.00	91.00
San Jose	3/10/93	-10.000	-1.00	2.80	77.00	240.00	54.00	0.850	4.50	85.00	-15.00	540.00
San Jose	3/10/93	12.000	-1.00	4.50	92.00	250.00	92.00	0.920	3.00	110.00	-15.00	410.00
San Luis Obispo	3/16/93	-10.000	-1.00	2.90	73.00	450.00	120.00	4.700	4.60	92.00	-15.00	590.00
Santa Barbara	3/3/93	-10.000	-1.00	-2.50	8.80	74.00	14.00	0.380	-2.50	4.80	-15.00	140.00
Santa Barbara	3/11/93	-10.000	-1.00	-2.50	7.10	68.00	9.50	0.340	-2.50	5.40	-15.00	120.00
Santa Rosa	3/4/93	-10.000	-1.00	8.60	27.00	360.00	120.00	2.500	-2.50	23.00	-15.00	440.00
Santa Rosa	3/11/93	-10.000	-1.00	3.20	16.00	270.00	57.00	1.200	-2.50	16.00	-15.00	270.00
South Tahoe	3/12/93	-10.000	-1.00	-2.50	2.90	66.00	6.20	0.160	-2.50	-2.50	-15.00	130.00

-888 = NOT ANALYZED; -999 = NOT DETECTED; Other negative numbers are detection limits

CITY NAME	DATE	ARSENIC	BERYLLIUM	CADMIUM	CHROM	COPPER	LEAD	MERCURY	MO	NICKEL	SELENIUM	ZINC
South Tahoe	3/19/93	-10.000	-1.00	-2.50	-2.50	59.00	5.00	0.160	-2.50	-2.50	-15.00	120.00
Thousand Oaks	3/4/93	-10.000	-1.00	4.70	13.00	260.00	43.00	1.300	5.10	18.00	-15.00	320.00
Thousand Oaks	3/17/93	16.000	-1.00	6.60	19.00	370.00	56.00	2.000	8.00	27.00	-15.00	470.00
Tracy	3/17/93	-10.000	-1.00	-2.50	38.00	210.00	47.00	0.800	10.00	32.00	-15.00	880.00
Tracy	3/17/93	-10.000	-1.00	-2.50	43.00	300.00	65.00	0.400	4.70	28.00	-15.00	1000.00
Vallejo	3/4/93	-10.000	-1.00	-2.50	3.30	46.00	7.30	0.530	-2.50	3.30	-15.00	79.00
Vallejo	3/11/93	-10.000	-1.00	-2.50	2.60	42.00	-5.00	0.210	-2.50	2.60	-15.00	75.00
West Contra Cost	3/10/93	-10.000	-1.00	-2.50	3.40	24.00	5.90	0.230	-2.50	3.70	-15.00	41.00
West Contra Cost	3/11/93	-10.000	-1.00	-2.50	2.50	11.00	3.00	0.110	-2.50	2.30	-15.00	170.00
West Sacramento	3/1/93	-10.000	-1.00	1.20	10.00	85.00	14.00	0.280	2.80	6.90	-15.00	550.00
West Sacramento	3/1/93	-10.000	-1.00	1.10	9.80	86.00	14.00	0.340	2.70	7.20	-15.00	530.00

COUNT:
59

-888 = NOT ANALYZED; -999 = NOT DETECTED; Other negative numbers are detection limits

APPENDIX 3

Database of Part 503 Pollutants

(dry weights, MG/KG)

from

'DRYWTS'

DRY WEIGHT DATA FOR METALS - MG/KG

CITY NAME	ARSENIC	BERYLLIUM	CADMIUM	CHROM	COPPER	LEAD	MERCURY	MO	NICKEL	SELENIUM	ZINC
Bakersfield				14.93	80.60	11.04	0.522		7.31		223.88
Bakersfield			4.10	50.60	397.59	44.58	1.205	9.16	16.87		987.95
CCCSD				28.57	285.71	24.76	5.238		22.86		357.14
CCCSD				66.67	300.00		6.190		39.05		357.14
Chino Basin				157.14	442.86	78.57	3.000	19.29	100.00		928.57
Chino Basin				150.00	442.86	85.71	3.929		92.86		928.57
Chino Basin											
Chino Basin											
Chino Basin			87.00	413.00	407.00	127.00	6.000		33.00	3.00	1800.00
Chino Basin			58.00	290.00	471.00	87.00			29.00		2609.00
Chino Basin			37.00	287.00	513.00	140.00	7.000		28.00		2533.00
Chino Basin	7.000			67.50	563.50	102.50		12.00	18.25	7.25	
Chino Basin	7.000			61.00	465.00	89.30		10.00	32.75	6.75	945.00
Chino Basin											
Chino Basin											
Chino Basin			6.00	54.00	800.00	267.00	7.000		40.00	4.00	667.00
Chino Basin			4.00	61.00	976.00	348.00			37.00		915.00
Chino Basin			5.00	61.00	1267.00	180.00			65.00		1067.00
Chino Basin	16.000			66.00	666.00	84.50		46.00	26.25	9.00	
Chino Basin	8.000			4.80	186.00	59.00		13.00	25.00	6.75	737.00
Corning				96.00	352.00	168.00	3.520		40.00		1200.00
Corning				160.00	23.20				68.00		40.00
Delta Diablo				31.11	422.22	83.33	1.889	15.00	27.78		944.44
Delta Diablo				31.11	472.22	111.11	2.278	16.11	27.78		988.89
Dublin/San Ramon				52.17	1082.61	52.17	1.739				769.57
EBMUD	3.682		18.18	118.18	518.18	150.00	4.545		38.18	0.91	1300.00
EBMUD			11.25	145.83	400.00	120.83	10.417	11.67	79.17		791.67
EBMUD			12.50	150.00	458.33	129.17	13.333		66.67		833.33
EBMUD	1.500		18.00	140.00	550.00	150.00	4.000		55.00	2.40	1200.00
EBMUD	1.100		19.00	180.00	550.00	150.00	5.200		52.00	1.40	1400.00
EBMUD	2.500	0.80	18.00	510.00	570.00	140.00	5.800		68.00		1300.00
EBMUD			18.00	230.00	510.00	100.00			60.00		1100.00
EBMUD	3.700		21.00	130.00	490.00	160.00	2.100		48.00	1.40	1000.00
EBMUD			18.00	160.00	610.00	130.00			52.00		1400.00
Encina		3.45	11.88	41.31	209.39	96.21	2.207		33.39	14.15	1171.48
Encina				7.30	196.32	41.17	3.988				742.33
Encina			3.04	10.14	161.00		2.624				262.37
Encina				46.63	347.89		2.147				1036.27
Encina			4.74	42.37	666.67	71.15	3.846	15.58	29.42		1032.05
Encina			3.39	86.73	500.00	74.51	3.771	21.34	31.83	12.59	1131.22
Encina			7.25	28.01	259.48	52.89	3.726				479.04
Encina				38.00	480.00	59.00	5.000	18.00	23.00		1300.00
Encina				35.79	468.42	47.89	3.158	15.79	20.00		1473.68
Encina	4.360	0.12	8.62	57.40	654.00	94.00	4.060		37.80	7.89	1620.00
Encina	1.550	0.17	10.09	51.10	655.00	90.00	4.360		36.80	2.75	1486.00
Encina	5.020	0.07	10.14	44.20	465.00	91.00	3.470		43.50	5.11	1520.00
Encina	0.230		10.30	43.80	473.00	81.00	6.150		45.80	1.48	1880.00
Encina	1.180		6.31	35.40	431.00	52.00	3.570		38.20	2.48	2090.00

CITY NAME	ARSENIC	BERYLLIUM	CADMIUM	CHROM	COPPER	LEAD	MERCURY	MO	NICKEL	SELENIUM	ZINC
Encina	3.600		9.98	39.90	480.00	90.00	4.080		37.00	0.87	2061.00
Encina	2.650	0.19	9.42	38.80	430.00	91.00	4.700		35.80	1.70	1976.00
Encina					406.00			14.10			1120.00
Eureka				56.00	860.00	120.00	4.000				1300.00
Eureka				140.00	800.00	120.00	4.000		88.00		1300.00
Fallbrook		0.17	3.72	9.28	423.78	19.51	1.433		6.63		335.37
Fallbrook				21.00	1000.00	50.00	3.000		26.00		490.00
Fallbrook				24.17	1000.00	33.33	1.667		21.67		491.67
Fresno	2.810		3.83	50.51	122.55	58.50	1.642	5.55	32.48	2.74	596.09
Fresno				350.00	355.00		115.000		150.00		1000.00
Fresno				133.33	400.00		66.667				933.33
Fresno	5.000		4.20	80.00	310.00	100.00	18.750		60.00	3.40	1050.00
Manteca					300.00		3.500				850.00
Manteca					300.00		4.000				850.00
Modesto				100.00	360.00	180.00	5.200		200.00	4.20	1320.00
Modesto				55.56	255.56	63.33	2.889		35.56		877.78
Modesto					140.00						460.00
Modesto				6.00	19.00	9.00	0.270		11.00	0.22	69.00
Modesto	8.000		3.00	57.00	317.00	80.00	4.500		31.00	2.20	1040.00
Modesto	7.000			88.00	274.00		1.900		90.00		800.00
Monterey				45.00	700.00	91.67	3.333				1833.33
Monterey				56.00	800.00	110.00	4.000				2000.00
Napa	8.280	0.62	3.10	2344.00	188.00	148.00	0.500	3.60	77.00	1.70	516.00
Napa	8.900			1689.00	578.00	644.00	7.110	66.70	133.00	8.90	1511.00
Napa	9.600			481.00	1037.00	926.00	15.200		74.00	7.40	2851.00
Napa	0.050	0.37	4.20	1012.00	166.00	128.00	0.360		104.00	0.78	471.00
Napa	9.500	2.80	1.80	1017.00	175.00	163.00	0.910	5.30	63.00	0.68	270.00
Napa	7.400	0.41	2.60	665.00	281.00	222.00	1.610	5.10	59.00	2.10	563.00
Napa	6.700	0.51	6.10	2642.00	386.00	549.00	1.400	34.50	51.00	0.47	1789.00
Orange Cnty			24.71	147.06	1058.82	123.53	13.529	26.47	135.29		823.53
Orange Cnty			24.78	108.70	695.65	121.74	7.826	21.30	100.00		869.57
Orange Cnty			31.11	161.11	1111.11	166.67			177.78		944.44
Orange Cnty	3.900		25.00	350.00	1600.00	230.00	8.000		230.00	4.80	910.00
Orange Cnty	4.400		28.00	350.00	1590.00	240.00			240.00	1.20	930.00
Orange Cnty	4.000		27.00	270.00	1430.00	190.00			220.00	1.40	1060.00
Orange Cnty	3.400		27.00	250.00	1450.00	210.00	0.160		230.00	4.70	980.00
Orange Cnty	2.700		36.00	350.00	1490.00	220.00			230.00	3.00	1070.00
Orange Cnty	2.400		28.00	280.00	1420.00	200.00			240.00	5.30	980.00
Orange Cnty	3.100		36.00	240.00	1240.00	188.00	4.100		180.00	3.20	650.00
Orange Cnty	4.100		27.00	110.00	1440.00	210.00			180.00	3.30	1020.00
Orange Cnty	3.200		30.00	230.00	1740.00	180.00			170.00	1.80	1010.00
Orange Cnty	4.900		26.00	280.00	1390.00	190.00	3.400		200.00	3.20	1060.00
Orange Cnty	4.400		22.00	260.00	1290.00	130.00			160.00	4.40	920.00
Orange Cnty	4.600		18.00	240.00	1280.00	150.00			150.00	2.70	840.00
Orange Cnty	4.200		15.00	200.00	1140.00	160.00	4.000		120.00	1.90	800.00
Orange Cnty	4.200	0.39	18.00	200.00	1180.00	120.00	1.700		150.00	4.90	920.00
Orange Cnty	4.900		20.00	230.00	1190.00	170.00			180.00	1.80	950.00
Orange Cnty	4.600		19.00	220.00	1130.00	160.00	5.300		210.00	2.00	810.00
Orange Cnty	4.400	0.43	25.00	220.00	1120.00	150.00	2.800		190.00	5.00	890.00

CITY NAME	ARSENIC	BERYLLIUM	CADMIUM	CHROM	COPPER	LEAD	MERCURY	MO	NICKEL	SELENIUM	ZINC
Orange Cnty	4.000		28.00	260.00	1310.00	190.00			200.00	2.10	1100.00
Orange Cnty	3.800		24.50	190.00	1390.00	160.00	5.400		180.00	37.00	830.00
Orange Cnty	3.500		40.00	260.00	2110.00	240.00	3.900		210.00	15.00	1100.00
Orange Cnty											
Orange Cnty	5.400		28.00	220.00	1200.00	190.00	2.700		210.00	3.00	1110.00
Orange Cnty	4.600		29.00	230.00	1220.00	170.00			210.00	6.90	1060.00
Orange Cnty	4.500		28.00	310.00	1110.00	160.00			200.00	2.80	1090.00
Orange Cnty	4.900		18.00	260.00	840.00	130.00	2.200		160.00	2.50	900.00
Orange Cnty	1.900	0.82	23.00	300.00	1180.00	260.00			210.00	6.30	1220.00
Orange Cnty	4.400		28.00	280.00	1260.00	240.00			190.00	2.40	1070.00
Orange Cnty	4.000		31.00	240.00	1170.00	230.00	3.000		190.00	2.50	950.00
Orange Cnty	4.400	0.94	30.00	190.00	1170.00	210.00			220.00	5.60	1000.00
Orange Cnty	4.400		23.00	140.00	1220.00	210.00			180.00	3.20	920.00
Orange Cnty			19.00	210.00	1270.00	160.00	2.600		200.00		910.00
Orange Cnty			32.00	250.00	1400.00	220.00			280.00		1280.00
Orange Cnty	4.700	0.63	27.00	220.00	1000.00	130.00			160.00	7.40	950.00
Orange Cnty			30.00	490.00	1380.00	200.00	3.100		260.00		1370.00
Orange Cnty			48.00	480.00	1310.00	190.00			290.00		1470.00
Orange Cnty	5.600	0.17	28.00	310.00	1110.00	160.00		21.00	200.00	4.40	1090.00
Orange Cnty			17.40	282.00	737.00	125.00	3.200		154.00		797.00
Orange Cnty	7.900	1.00	29.70	227.00	1070.00	113.00		19.00	172.00	6.80	1130.00
Orange Cnty			31.10	308.00	1170.00	136.00			222.00		1330.00
Orange Cnty			15.70	265.00	708.00	118.00	3.200		146.00		760.00
Orange Cnty	4.700		23.00	136.00	1220.00	213.00		24.70	184.00	8.40	920.00
Orange Cnty			33.00	260.00	1110.00	232.00			149.00		1100.00
Orange Cnty			42.10	233.00	766.00	173.00			127.00		850.00
Orange Cnty			34.90	229.00	928.00	166.00			137.00		986.00
Orange Cnty			32.20	211.00	1142.00	167.00	0.640		141.00		1082.00
Orange Cnty			31.43	119.05	904.76	109.52			123.81		1047.62
Orange Cnty	5.500	7.00	20.00	210.00	855.00	120.00	3.200		90.00	1.60	720.00
Orange Cnty	7.300		33.00	280.00	1020.00	150.00			120.00	1.60	900.00
Orange Cnty	7.400		33.00	300.00	1190.00	170.00			110.00	2.10	1040.00
Orange Cnty	5.200		29.00	270.00	1240.00	170.00	5.300		100.00	4.50	980.00
Orange Cnty	4.700		30.00	260.00	1170.00	150.00			150.00	4.10	1030.00
Orange Cnty	3.000		22.00	230.00	1050.00	140.00			96.00	2.30	900.00
Orange Cnty	4.500		30.00	180.00	1020.00	150.00	11.300		120.00	3.50	920.00
Orange Cnty	3.300		21.00	190.00	1020.00	140.00			110.00	2.80	1000.00
Orange Cnty	3.500		29.00	220.00	1070.00	170.00			97.00	2.30	1020.00
Orange Cnty	5.400		22.00	260.00	1030.00	170.00	4.800		100.00	3.10	1050.00
Orange Cnty	5.100	0.21	19.00	190.00	1000.00	150.00			96.00	3.90	932.00
Orange Cnty	4.600		25.00	160.00	950.00	140.00			87.00	2.60	1000.00
Orange Cnty	4.700		22.00	130.00	890.00	120.00	3.800		59.00	2.00	830.00
Orange Cnty	4.400	0.38	40.00	160.00	1040.00	120.00	2.700		90.00	3.40	1000.00
Orange Cnty	5.000		23.00	150.00	970.00	110.00			87.00	2.00	940.00
Orange Cnty	5.100		22.00	150.00	980.00	150.00	4.400		110.00	2.20	880.00
Orange Cnty	6.200	0.29	24.00	150.00	1040.00	130.00	2.700		100.00	4.40	940.00
Orange Cnty	5.000		21.00	140.00	970.00	130.00			90.00	2.30	860.00
Orange Cnty	4.800		16.10	140.00	960.00	140.00	4.400		78.00	48.00	780.00
Orange Cnty	5.200		20.00	140.00	1140.00	160.00	2.300		120.00	5.90	960.00

CITY NAME	ARSENIC	BERYLLIUM	CADMIUM	CHROM	COPPER	LEAD	MERCURY	MO	NICKEL	SELENIUM	ZINC
Orange Cnty											
Orange Cnty	6.500		19.00	150.00	980.00	130.00			80.00	3.10	850.00
Orange Cnty	7.000		21.00	130.00	1030.00	130.00			90.00	4.00	890.00
Orange Cnty	5.800		35.00	210.00	1040.00	130.00			100.00	2.60	1440.00
Orange Cnty	5.000		30.00	160.00	890.00	120.00	3.300		83.00	2.40	1140.00
Orange Cnty	5.200	0.27	21.00	130.00	820.00	110.00	1.400		82.00	4.90	880.00
Orange Cnty	4.000		20.00	120.00	840.00	110.00			82.00	2.30	920.00
Orange Cnty	3.800		24.00	130.00	740.00	110.00	4.300		74.00	2.60	810.00
Orange Cnty	5.000	0.50	27.00	120.00	880.00	120.00			100.00	4.70	960.00
Orange Cnty	4.800		23.00	100.00	790.00	120.00			81.00	3.10	850.00
Orange Cnty			20.00	144.00	960.00	130.00	3.900		89.00		920.00
Orange Cnty			19.00	130.00	1030.00	140.00			110.00		1110.00
Orange Cnty	7.300	0.36	30.00	110.00	870.00	110.00			38.00	7.70	910.00
Orange Cnty			21.00	200.00	784.00	120.00	2.700		86.00		860.00
Orange Cnty				320.00	1020.00	140.00			100.00		1200.00
Orange Cnty	7.400	0.78	20.00	210.00	1040.00	130.00		19.00	100.00	6.40	1440.00
Orange Cnty			36.00	176.00	1050.00	137.00	8.600		96.30		1370.00
Orange Cnty	6.800	0.77	16.10	114.00	830.00	117.00		17.00	107.00	3.60	900.00
Orange Cnty			16.90	129.00	813.00	114.00			119.00		960.00
Orange Cnty			23.90	202.00	783.00	116.00	3.700		110.00		954.00
Orange Cnty	7.700	2.14	23.40	104.00	790.00	116.00	1.800	50.00	80.60	7.70	950.00
Orange Cnty			24.70	138.00	830.00	127.00			144.00		1030.00
Orange Cnty			24.90	169.00	695.00	104.00			122.00		896.00
Orange Cnty			16.90	100.00	556.00	58.50			75.10		697.00
Orange Cnty			35.50	100.00	710.00	95.50	0.450		85.70		911.00
Palo Alto				30.00	440.00	132.00	2.800		44.00		712.00
Palo Alto				32.00	412.00	120.00	2.400	10.00	40.00		680.00
Redding			34.12	58.82	341.18	31.76	1.529		45.29		470.59
Redding			25.79	52.63	321.05		0.947		43.16		421.05
Redding - CC	14.571		45.71	45.71	400.00	157.14	1.171		34.29	3.14	1057.14
Redding - CC					368.42	1684.21	5.526			2.42	1236.84
Rialto				59.23	500.00	60.77	3.077		26.15		923.08
Rialto				52.31	569.23	55.38	2.308	23.85	20.77		923.08
Riverside				44.55	492.38	57.44	2.227		16.41		656.51
Riverside			5.18	70.59	882.35	71.76	2.118	14.12	21.18		1000.00
Riverside			5.47	75.47	981.13	81.13	3.962	10.00	25.09		1094.34
Riverside				53.00	770.00	70.00	2.500		24.00		950.00
Riverside				55.00	720.00	65.00	2.500		25.00		825.00
Riverside				58.00	810.00	72.00	2.300		19.00		970.00
Riverside				57.00	880.00	76.00	2.100		21.00		1040.00
Riverside				57.00	870.00	83.00	2.500		22.00		1100.00
Riverside	3.500		2.80	56.00	650.00	7.20			21.00	3.30	780.00
Sacto Regional				130.00	310.00						650.00
Sacto Regional				140.00	320.00						650.00
Sacto Regional			8.80	95.00		170.00	4.000			2.00	670.00
Sacto Regional			6.60	46.00	330.00	60.00			140.00		370.00
Sacto Regional			4.20	40.00	240.00	52.00	2.800				460.00
Sacto Regional			4.20	48.00	260.00	69.00			22.00		570.00
Sacto Regional	3.000		7.50	95.00	750.00	135.00	11.000		42.00	6.50	2400.00

CITY NAME	ARSENIC	BERYLLIUM	CADMIUM	CHROM	COPPER	LEAD	MERCURY	MO	NICKEL	SELENIUM	ZINC
Sacto Regional			4.10	48.00	240.00	96.00			16.00		670.00
Sacto Regional			7.30	61.00	430.00	120.00	3.000		16.00		790.00
Sacto Regional			9.50	134.00	671.00	190.00	4.200		43.00		1200.00
San Diego				110.00	200.00	31.43	1.571	11.43	47.14		300.00
San Diego				21.25	73.75	13.75	0.875	4.38	10.88		113.75
San Diego	6.000		6.00	121.00	356.00	82.00	2.400		76.00	0.80	458.00
San Diego	6.000		3.00	103.00	284.00	59.00	2.300		46.00	1.10	514.00
San Diego	5.000		7.00	140.00	360.00	110.00	2.600		87.00		480.00
San Diego	5.000		7.00	140.00	360.00	110.00	2.600		90.00		480.00
San Diego	4.400		7.00	130.00	350.00	200.00	2.600		98.00		450.00
San Diego	5.000		7.00	160.00	340.00	100.00	3.100		100.00		440.00
San Diego	8.000			110.00	400.00		2.300		80.00	1.80	540.00
San Diego	7.000		10.00	150.00	400.00	130.00	2.000		83.00	1.80	530.00
San Diego	4.000		6.00	110.00	340.00	69.00	1.000		70.00	0.60	420.00
San Diego	4.400		8.00	130.00	360.00	84.00	5.300		76.00		460.00
San Diego	4.700		6.00	110.00	340.00	69.00	1.000		70.00		460.00
San Diego	5.000		6.00	130.00	360.00	76.00	2.900		69.00	0.40	430.00
San Diego	4.100		7.00	94.00	320.00	75.00	2.000		65.00	0.10	420.00
San Diego	6.000		7.00	130.00	380.00	93.00	1.800		80.00	0.10	480.00
San Diego	5.500		7.00	130.00	380.00	93.00	1.800		80.00	0.10	480.00
San Diego	5.800		9.00	110.00	310.00	77.00	1.500	14.00	62.00	0.20	400.00
San Diego	3.600		5.00	72.00	280.00	65.00	1.200		56.00	0.20	390.00
San Diego	6.000		7.00	170.00	410.00	110.00	4.800		77.00		520.00
San Diego	7.000		5.00	140.00	340.00	85.00	3.200		67.00		440.00
San Diego	7.200		5.00	140.00	340.00	85.00	3.200	15.00	67.00		440.00
San Diego	5.000		8.00	110.00	320.00	68.00	2.400		76.00	2.60	420.00
San Diego	4.000				230.00	53.00	1.200		46.00	1.30	300.00
San Diego	5.000		6.00	99.00	390.00	90.00	1.900		71.00	1.50	490.00
San Diego	5.000		6.00	105.00	290.00	84.00	2.000		40.00	0.80	400.00
San Diego	4.600	6.00	6.00	105.00	290.00	84.00	2.000		40.00	0.80	400.00
San Diego	4.400	7.00	4.00	90.00	270.00	77.00	1.500		49.00	0.70	390.00
San Diego	7.000		5.00	117.00	319.00	74.00	3.100		44.00	1.30	611.00
San Diego	6.600		5.20	117.00	322.00	74.00	3.100		44.00	1.30	611.00
San Diego	6.000		5.00	82.00	290.00	67.00	2.000		44.00	0.70	660.00
San Diego	6.100	0.50	4.60	82.00	290.00	67.00	2.000		4.40	0.70	660.00
San Diego	6.000		4.00	112.00	248.00	56.00	2.400		48.00	0.80	575.00
San Diego	5.500		4.20	112.00	248.00	55.00	2.400		48.00	0.82	575.00
San Diego	7.100		12.00	240.00	680.00	175.00	3.600		108.00	1.80	795.00
San Diego	4.200		18.00	140.00	500.00	150.00	3.300		120.00	1.10	640.00
San Diego	7.000			117.00	294.00	58.00	2.400		48.00	1.40	440.00
San Diego	6.700			117.00	294.00	58.00	2.400		48.00	1.40	44.00
San Diego	6.700			117.00	294.00	58.00	2.400		48.00	1.40	440.00
San Diego	5.000			105.00	264.00	75.00	1.900		59.00	1.30	499.00
San Diego	5.100			105.00	264.00	75.00	1.800		59.00	1.30	499.00
San Diego	6.000			82.00	280.00		2.000		40.00	1.40	410.00
San Diego	5.900		4.40	127.00	280.00	44.00	2.000			1.40	410.00
San Diego	7.600		7.00	114.00	327.00	72.00	2.200		49.00	1.90	590.00
San Diego	7.000		10.00	124.00	323.00	54.00	2.400		48.00	1.60	475.00
San Diego	7.000		10.00	125.00	320.00	54.00	2.400		48.00	1.60	470.00

CITY NAME	ARSENIC	BERYLLIUM	CADMIUM	CHROM	COPPER	LEAD	MERCURY	MO	NICKEL	SELENIUM	ZINC
San Diego	5.000		10.00	227.00	620.00	181.00	3.500		80.00	1.00	861.00
San Diego	5.000		10.00	245.00	572.00	177.00	2.900		76.00	0.90	790.00
San Diego	5.000			90.00	260.00	52.00	1.900		36.00	0.90	396.00
San Diego	5.000			90.00	260.00	52.00	1.900		36.00	0.90	396.00
San Diego	6.200		3.90	75.00	265.00	51.00	1.500		56.00		390.00
San Diego	6.200	0.63	3.90	75.00	265.00	51.00	1.500		56.00		390.00
San Diego	6.700		7.60	66.00	329.00	70.00	2.000		43.00	1.80	450.00
San Diego	6.700		8.00	66.00	329.00		2.000			1.80	450.00
San Diego	6.700		7.60	65.00	329.00	55.00	1.900			1.80	450.00
San Diego	5.900		5.90	89.00	386.00	72.00	2.300		47.00	1.40	599.00
San Diego	7.300		6.70	85.00	392.00	69.00	2.500		52.00	1.10	666.00
San Diego	5.870		5.90	89.00	386.00	72.00	2.300		47.40	1.40	599.00
San Diego	7.250		6.70	85.00	392.00	69.00	2.500		51.70	1.10	666.00
San Jose			3.64	100.00	311.69	70.13	1.104	5.84	110.39		701.30
San Jose			5.84	119.48	324.68	119.48	1.195	3.90	142.86		532.47
San Luis Obispo			6.74	169.77	1046.51	279.07	10.930	10.70	213.95		1372.09
Santa Barbara				44.00	370.00	70.00	1.900		24.00		700.00
Santa Barbara				41.76	400.00	55.88	2.000		31.76		705.88
Santa Barbara	3.800		6.30	55.00	400.00	94.00	0.560		38.00		800.00
Santa Barbara	0.100		6.40	130.00	410.00	130.00	0.640		30.00		700.00
Santa Barbara	2.200		7.20	100.00	470.00	22.00	0.270		34.00		600.00
Santa Barbara			7.60	40.00	635.00	39.00	0.030		44.00		1580.00
Santa Barbara	2.500		6.70	36.00	515.00	147.00	8.700		31.00		920.00
Santa Barbara	7.600		9.00	37.00	600.00	146.00	0.120		44.00		1000.00
Santa Barbara	19.100		6.90	108.00	700.00	206.00	0.770		95.00		590.00
Santa Barbara	16.000		3.00	74.00	517.00	72.00	0.230		26.00		312.00
Santa Barbara	20.000		7.00	145.00	690.00	108.00	0.680		50.00		1000.00
Santa Barbara	14.000		14.30	220.00	613.00	120.00	1.100		41.00		840.00
Santa Barbara	18.500		45.00	151.00	637.00	136.00	1.000		45.00		870.00
Santa Barbara	16.500		6.20	100.00	700.00	150.00	0.430		37.00		930.00
Santa Barbara	8.400		7.30	83.00	696.00	107.00	2.570		95.00		1090.00
Santa Barbara	5.400		10.00	135.00	625.00	81.30	0.380		48.00		1100.00
Santa Barbara	18.000		2.00	151.00	550.00	31.00	0.230		26.00		800.00
Santa Barbara	2.100		7.10	110.00	710.00	50.00	0.320		35.00		900.00
Santa Barbara	4.000		3.00	27.00	270.00	54.00	0.160		23.00		500.00
Santa Rosa	4.097		4.17	34.72	1250.00	55.56	1.111	48.61	27.78		1041.67
Santa Rosa	8.075		6.21	45.34	1428.57	111.80	2.360	12.42	33.54	2.92	931.68
Santa Rosa	15.966		19.33	109.24	2268.91	327.73	12.605		92.44	1.60	2184.87
Santa Rosa	7.778		11.11	55.56	1500.00	72.22	0.611	5.56	45.56	0.83	277.78
Santa Rosa			40.95	128.57	1714.29	571.43	11.905		109.52		2095.24
Santa Rosa			15.24	76.19	1285.71	271.43	5.714		76.19		1285.71
Santa Rosa	9.244		6.81	84.03	1848.74	159.66	5.798		72.27	11.76	1512.61
South Tahoe				13.18	300.00	28.18	0.727				590.91
South Tahoe					226.92	19.23	0.615				461.54
Thousand Oaks			12.05	33.33	666.67	110.26	3.333	13.08	46.15		820.51
Thousand Oaks	34.043		14.04	40.43	787.23	119.15	4.255	17.02	57.45		1000.00
Tracy				60.32	333.33	74.60	1.270	15.87	50.79		1396.83
Tracy				72.88	508.47	110.17	0.678	7.97	47.46		1694.92
Vallejo				15.00	209.09	33.18	2.409		15.00		359.09

CITY NAME	ARSENIC	BERYLLIUM	CADMIUM	CHROM	COPPER	LEAD	MERCURY	MO	NICKEL	SELENIUM	ZINC
Vallejo				11.82	190.91		0.955		11.82		340.91
West Contra Costa				56.67	400.00	98.33	3.833		61.67		683.33
West Contra Costa				62.50	275.00	75.00	2.750		57.50		4250.00
West Contra Costa	4.750			50.00	250.00	225.00	0.800		25.00	0.35	350.00
West Sacramento			8.57	71.43	607.14	100.00	2.000	20.00	49.29		3928.57
West Sacramento			8.46	75.38	661.54	107.69	2.615	20.77	55.38		4076.92
West Sacramento	16.154		10.00	592.31	1538.46	238.46	3.077		65.38	4.62	1461.54
West Sacramento	9.231		9.23	184.62	661.54	161.54	2.077		50.00	6.15	1153.85
West Sacramento	84.615		13.85	223.08	1307.69	253.85	3.923		161.54	5.85	2461.54
West Sacramento	16.154		12.31	107.69	1000.00	200.00	5.231		60.00	4.62	2615.38
West Sacramento	9.231		13.85	100.00	923.08	230.77	10.769		58.46		4153.85
West Sacramento						169.23					4153.85
West Sacramento			11.54	76.92	753.85	169.23	3.462		42.31	6.15	3384.62
West Sacramento			10.00	75.38	769.23	176.92	3.077		43.08	6.92	3923.08
West Sacramento	18.462		13.85	153.85	1153.85	200.00	4.000		58.46	5.38	4769.23
West Sacramento			9.23	72.31	769.23	207.69	2.077		40.77		3230.77
West Sacramento	15.385		13.85	676.92	1230.77	400.00	4.769		76.92	6.62	2153.85

COUNT:
310

APPENDIX 4

Statistics
for
Dry Weight Metals

1 - All Data
2 - CIWMB Data
3 - Sand Diego Data
4 - Sacramento Regional Data
5 - Chino Basin Data
6 - EBMUD Data
7 - Encina Data
8 - Napa Data
9 - Orange County Data

Dry Weight Statistics for Metals - All Samples

	ARSENIC	BE	CADMIUM	CHROME	COPPER	LEAD	MERCURY	MOLY	NICKEL	SE	ZINC
Count	183.000	33.000	230.000	296.000	302.000	286.000	232.000	48.000	280.000	161.000	302.000
Average	6.667	1.239	16.402	165.279	683.897	133.012	4.005	17.516	82.917	3.668	995.941
Minimum	0.050	0.070	1.800	4.800	19.000	7.200	0.030	3.600	4.400	0.100	40.000
Maximum	84.615	7.000	87.000	2642.000	2268.908	1684.211	115.000	66.700	290.000	48.000	4769.231
Std Dev	7.103	1.869	12.083	246.706	404.840	129.171	8.827	12.634	59.518	5.137	692.930
Var	50.457	3.493	145.994	60863.752	#########	16685.183	77.911	159.608	3542.373	26.390	#########

Values in mg/kg dry weight

Dry Weight Statistics for Metals - CIWMB Samples

	ARSENIC	BE	CADMIUM	CHROME	COPPER	LEAD	MERCURY	MOLY	NICKEL	SE	ZINC
Count	1.000	0.000	21.000	63.000	68.000	56.000	64.000	27.000	56.000	0.000	68.000
Average	34.043	ERR	14.446	77.999	518.715	117.704	8.043	14.538	57.649	ERR	1039.761
Minimum	34.043	ERR	3.636	9.500	23.200	3.095	0.522	3.896	5.000	ERR	40.000
Maximum	34.043	ERR	40.952	350.000	1714.286	908.571	115.000	26.471	213.953	ERR	4250.000
Std Dev	0.000	ERR	10.204	57.667	315.629	155.167	17.968	6.144	46.471	ERR	822.471

Values in mg/kg dry weight

Dry Weight Statistics for Metals - San Diego

	ARSENIC	BE	CADMIUM	CHROME	COPPER	LEAD	MERCURY	MOLY	NICKEL	SE	ZINC
Count	57.000	4.000	47.000	58.000	59.000	56.000	59.000	4.000	56.000	46.000	59.000
Average	5.772	3.533	6.821	114.522	333.826	80.539	2.297	11.201	60.134	1.135	483.945
Minimum	3.600	0.500	3.000	21.250	73.750	13.750	0.875	4.375	4.400	0.100	44.000
Maximum	8.000	7.000	18.000	245.000	680.000	200.000	5.300	15.000	120.000	2.600	861.000
Std Dev	1.057	2.989	2.542	38.687	91.555	36.060	0.797	4.151	21.455	0.545	136.076
Var	1.118	8.933	6.460	1496.651	8382.378	1300.303	0.635	17.228	460.332	0.297	18516.744

Dry Weight Statistics for Metals - Sacramento Regional

	ARSENIC	BE	CADMIUM	CHROME	COPPER	LEAD	MERCURY	MOLY	NICKEL	SE	ZINC
Count	1.000	0.000	8.000	10.000	9.000	8.000	5.000	0.000	6.000	2.000	10.000
Average	3.000	ERR	6.525	83.700	394.556	111.500	5.000	ERR	46.500	4.250	843.000
Minimum	3.000	ERR	4.100	40.000	240.000	52.000	2.800	ERR	16.000	2.000	370.000
Maximum	3.000	ERR	9.500	140.000	750.000	190.000	11.000	ERR	140.000	6.500	2400.000
Std Dev	0.000	ERR	2.009	38.071	178.504	48.021	3.049	ERR	43.273	2.250	559.804
Var	0.000	ERR	4.034	1449.410	31863.802	2306.000	9.296	ERR	1872.583	5.063	#########

Dry Weight Statistics for Metals - Chino Basin

	ARSENIC	BE	CADMIUM	CHROME	COPPER	LEAD	MERCURY	MOLY	NICKEL	SE	ZINC
Count	4.000	0.000	6.000	12.000	12.000	12.000	5.000	5.000	12.000	6.000	10.000
Average	9.500	ERR	32.833	139.370	600.018	137.382	5.386	20.057	43.926	6.125	1313.014
Minimum	7.000	ERR	4.000	4.800	186.000	59.000	3.000	10.000	18.250	3.000	667.000
Maximum	16.000	ERR	87.000	413.000	1267.000	348.000	7.000	46.000	100.000	9.000	2609.000
Std Dev	3.775	ERR	31.387	120.470	278.750	83.779	1.637	13.338	25.975	2.025	693.123
Var	14.250	ERR	985.139	14513.117	77701.750	7018.930	2.681	177.899	674.720	4.099	#########

Dry Weight Statistics for Metals - EBMUD

	ARSENIC	BE	CADMIUM	CHROME	COPPER	LEAD	MERCURY	MOLY	NICKEL	SE	ZINC
Count	5.000	1.000	9.000	9.000	9.000	9.000	7.000	1.000	9.000	4.000	9.000
Average	2.496	0.800	17.104	196.002	517.391	136.667	6.485	11.667	57.668	1.527	1147.222
Minimum	1.100	0.800	11.250	118.182	400.000	100.000	2.100	11.667	38.182	0.909	791.667
Maximum	3.700	0.800	21.000	510.000	610.000	160.000	13.333	11.667	79.167	2.400	1400.000
Std Dev	1.077	0.000	2.955	115.222	59.203	17.590	3.658	0.000	11.547	0.542	217.591
Var	1.159	0.000	8.735	13276.040	3504.978	309.414	13.378	0.000	133.323	0.294	47345.679

Values in mg/kg dry weight

Dry Weight Statistics for Metals - Encina

	ARSENIC	BE	CADMIUM	CHROME	COPPER	LEAD	MERCURY	MOLY	NICKEL	SE	ZINC
Count	7.000	5.000	12.000	16.000	17.000	14.000	16.000	5.000	12.000	9.000	17.000
Average	2.656	0.800	7.931	40.430	428.422	73.702	3.803	16.962	34.378	5.447	1316.556
Minimum	0.230	0.070	3.041	7.301	161.002	41.166	2.147	14.100	20.000	0.870	262.373
Maximum	5.020	3.452	11.885	86.727	666.667	96.208	6.150	21.342	45.800	14.148	2090.000
Std Dev	1.633	1.327	2.820	17.391	150.147	18.810	0.984	2.520	7.205	4.710	513.803
Var	2.667	1.760	7.952	302.435	22544.076	353.811	0.969	6.350	51.915	22.187	#########

Dry Weight Statistics for Metals - Napa

	ARSENIC	BE	CADMIUM	CHROME	COPPER	LEAD	MERCURY	MOLY	NICKEL	SE	ZINC
Count	7.000	5.000	5.000	7.000	7.000	7.000	7.000	5.000	7.000	7.000	7.000
Average	7.204	0.942	3.560	1407.143	401.571	397.143	3.870	23.040	80.143	3.147	1138.714
Minimum	0.050	0.370	1.800	481.000	166.000	128.000	0.360	3.600	51.000	0.470	270.000
Maximum	9.600	2.800	6.100	2642.000	1037.000	926.000	15.200	66.700	133.000	8.900	2851.000
Std Dev	3.083	0.933	1.489	774.494	293.286	288.765	5.106	24.706	26.728	3.234	879.376
Var	9.503	0.871	2.218	#########	86016.816	83385.265	26.073	610.398	714.408	10.461	#########

Dry Weight Statistics for Metals - Orange County

	ARSENIC	BE	CADMIUM	CHROME	COPPER	LEAD	MERCURY	MOLY	NICKEL	SE	ZINC
Count	66.000	17.000	91.000	92.000	92.000	92.000	39.000	8.000	92.000	66.000	92.000
Average	4.792	1.005	25.956	209.923	1084.428	154.646	3.995	24.809	143.952	5.009	982.502
Minimum	1.900	0.170	15.000	100.000	556.000	58.500	0.160	17.000	38.000	1.200	650.000
Maximum	7.900	7.000	48.000	490.000	2110.000	260.000	13.529	50.000	290.000	48.000	1470.000
Std Dev	1.257	1.566	6.458	77.200	252.287	39.960	2.674	9.954	55.843	7.049	157.496
Var	1.581	2.451	41.708	5959.881	63648.493	1596.825	7.150	99.077	3118.458	49.684	24804.942

APPENDIX 5

Statistics
for
Dry Weight Metals

By Flow Rate Group

1 - 1-10 MGD Flows
2 - 10-100 MGD Flows
3 - > 100 MGD Flows

Dry Weight Statistics for Metals - POTWs Having Flows 1 - 10 MGD

	ARSENIC	BE	CADMIUM	CHROME	COPPER	LEAD	MERCURY	MOLY	NICKEL	SE	ZINC
Count	35.000	6.000	44.000	67.000	71.000	68.000	66.000	17.000	64.000	21.000	71.000
Average	13.006	0.813	10.561	234.971	604.513	177.041	2.697	19.680	52.330	4.476	1351.743
Minimum	0.050	0.168	1.800	4.800	23.200	19.231	0.030	3.600	6.631	0.350	40.000
Maximum	84.615	2.800	45.714	2642.000	1538.462	1684.211	15.200	66.700	213.953	9.000	4769.231
Std Dev	14.153	0.899	9.579	483.871	310.846	234.667	2.810	15.685	33.277	2.703	1136.341
Var	200.317	0.809	91.761	#########	96625.026	55068.396	7.898	246.009	1107.349	7.306	#########

Values in mg/kg dry weight

Dry Weight Statistics for Metals - POTWs Having Flows 10 - 100 MGD

	ARSENIC	BE	CADMIUM	CHROME	COPPER	LEAD	MERCURY	MOLY	NICKEL	SE	ZINC
Count	24.000	6.000	38.000	67.000	69.000	60.000	61.000	17.000	60.000	26.000	68.000
Average	4.856	0.800	14.829	92.057	579.217	103.056	7.088	14.892	45.405	4.050	1120.495
Minimum	0.230	0.070	2.800	6.000	19.000	7.200	0.270	5.547	7.313	0.220	69.000
Maximum	15.966	3.452	87.000	510.000	2268.908	571.429	115.000	48.611	200.000	14.148	2609.000
Std Dev	3.404	1.211	16.334	93.758	413.276	81.484	16.349	9.437	33.833	3.724	552.477
Var	11.587	1.466	266.813	8790.494	#########	6639.717	267.303	89.064	1144.682	13.865	#########

Values in mg/kg dry weight

Dry Weight Statistics for Metals - POTWs Having Flows > 100 MGD

	ARSENIC	BE	CADMIUM	CHROME	COPPER	LEAD	MERCURY	MOLY	NICKEL	SE	ZINC
Count	124.000	21.000	148.000	162.000	162.000	158.000	105.000	14.000	156.000	114.000	163.000
Average	5.228	1.486	18.543	166.739	763.274	125.438	3.035	18.073	109.893	3.433	788.998
Minimum	1.900	0.170	3.000	21.250	73.750	13.750	0.160	3.896	4.400	0.100	44.000
Maximum	8.000	7.000	48.000	490.000	2110.000	260.000	13.529	50.000	290.000	48.000	2400.000
Std Dev	1.278	2.161	10.758	80.698	420.367	52.422	2.087	11.225	61.732	5.706	308.829
Var	1.633	4.671	115.737	6512.125	#########	2748.107	4.355	126.000	3810.799	32.554	95375.576

Values in mg/kg dry weight

APPENDIX 6

Database
of
Benzene and DEHP

(in original sample units of wet or dry weights)

from

'ANALYZE1'

DATABASE FOR BENZENE and DEHP (MG/KG)

CITY NAME	DATE	BENZENE	DEHP
Anderson	02/27/92	0.005	0.006
Anderson	08/09/90	-999	150
Anderson	08/11/89	-0.2	-10
Bakersfield	1991	-888	-888
Bakersfield	1992	-888	-888
Bakersfield	1/5/93	-888	-888
Bakersfield	1/5/93	-888	-888
CCCSD	03/11/92	-999	-999
CCCSD	03/12/91	-999	15
CCCSD	09/05/91	0.005	7.7
CCCSD	09/16/91	-999	7.18
CCCSD	3/16/93	-888	-888
CCCSD	3/23/93	-888	-888
Chino Basin 1	09/28/92	-888	0.61
Chino Basin 2	09/28/92	-888	0.58
Chino Basin 1	1/4/89	-888	-888
Chino Basin 2	1/4/89	-888	-888
Chino Basin 1	3/13/89	-888	-888
Chino Basin 2	3/13/89	-888	-888
Chino Basin 1	12/1/89	-888	-888
Chino Basin 2	12/1/89	-888	-888
Chino Basin 1	1991	-888	-888
Chino Basin 2	1991	-888	-888
Chino Basin 1	1992	-888	-888
Chino Basin 2	1992	-888	-888
Chino Basin 1	89-90	-888	0.0013
Chino Basin 2	89-90	-888	0.0037
Chino Basin 1	90-91	-888	-888
Chino Basin 2	90-91	-888	-888
Chino Basin	3/5/93	-888	-888
Chino Basin	3/13/93	-888	-888
Corning	10/15/92	-888	-888
Corning	3/22/93	-888	-888
Corning	3/22/93	-888	-888
Delta Diablo	3/8/92	-0.2	37
Delta Diablo	9/20/92	-0.2	85
Delta Diablo	3/10/91	-0.2	-30
Delta Diablo	9/15/91	-0.2	-0.5
Delta Diablo	3/11/90	-999	-888
Delta Diablo	9/9/90	-999	-888
Delta Diablo	3/12/89	-999	-999
Delta Diablo	9/10/89	-999	31
Delta Diablo	3/4/93	-888	-888
Delta Diablo	3/11/93	-888	-888
Dublin/San Ramon	01/01/90	-888	-888
Dublin/San Ramon	01/01/91	-0.2	-3
Dublin/San Ramon	01/01/92	-1	-1
Dublin/San Ramon	07/01/90	-888	-888
Dublin/San Ramon	07/01/91	-0.2	-3
Dunsmuir	1/16/91	-888	-888
EBMUD	01/14/91	-0.13	210
EBMUD	07/15/91	-0.07	260
EBMUD	5/25/92	-999	190
EBMUD	7/13/92	-999	500
EBMUD	7/7/89	-888	40
EBMUD	1/15/90	0.24	810
EBMUD	7/2/90	0.22	-999
EBMUD	3/11/93	-888	-888
EBMUD	3/23/93	-888	-888
Encina	6/11/90	-888	-888
Encina	6/10/91	-888	-888
Encina	6/15/92	-888	-888
Encina	7/20/92	-888	-888
Encina	8/17/92	-888	-999
Encina	9/20/92	-888	-888
Encina	10/19/92	-888	-888
Encina	11/25/92	-888	-888
Encina	5/18/92	-888	-888

-888 = NOT ANALYZED; -999 = NOT DETECTED; Other negative numbers are detection limits

CITY NAME	DATE	BENZENE	DEHP
Encina	2/18/92	-888	-888
Encina	8/27/91	-888	-888
Encina	3/12/91	-888	-888
Encina	6/11/91	-888	-888
Encina	8/17/92	-888	-888
Encina	12/14/92	-888	-888
Encina	3/10/93	-888	-888
Encina	3/16/93	-888	-888
Eureka	10/26/89	-888	-888
Eureka	10/30/91	0.004	-888
Eureka	10/31/91	-888	-888
Eureka	10/31/91	-888	-888
Eureka	11/19/92	-888	-888
Eureka	12/20/90	-999	-888
Eureka	3/5/93	-888	-888
Eureka	3/12/93	-888	-888
Fallbrook	10/20/92	-888	-888
Fallbrook	3/8/93	-888	-888
Fallbrook	3/15/93	-888	-888
Fresno	12/16/92	-888	0.35
Fresno		-888	-888
Fresno	3/17/93	-888	-888
Fresno	3/24/93	-888	-888
Manteca	03/02/89	-888	0.98
Manteca	04/02/91	-888	4.09
Manteca	04/05/90	-888	-999
Manteca	10/02/89	-888	30
Manteca	10/04/90	-888	-999
Manteca	11/07/91	-0.005	3.29
Manteca	11/24/92	-999	1.4
Manteca	3/4/93	-888	-888
Manteca	3/11/93	-888	-888
Modesto	01/15/91	-888	-888
Modesto	01/21/92	-888	-888
Modesto	01/23/90	-888	-888
Modesto	01/25/89	-888	-888
Modesto	04/16/91	-888	-888
Modesto	04/17/90	-888	-888
Modesto	04/18/89	-888	-888
Modesto	04/18/89	-888	-888
Modesto	07/18/91	-888	-888
Modesto	07/19/89	-888	-888
Modesto	07/24/90	-888	-888
Modesto	10/17/89	-888	-888
Modesto	10/17/90	-888	-888
Modesto	10/17/90	-888	-888
Modesto	11/10/91	-888	-888
Modesto	3/2/93	-888	-888
Modesto	3/10/93	-888	-888
Monterey	11/04/92	-999	100
Monterey	3/9/93	-888	-888
Monterey	3/16/93	-888	-888
Napa	03/02/92	0.016	1.8
Napa	03/14/90	0.04	-999
Napa	03/15/89	-999	0.9
Napa	03/15/91	-999	-999
Napa	09/01/92	-999	8.4
Napa	09/04/91	0.003	1.8
Napa	09/11/90	-999	3.9
Napa	09/27/89	0.002	40
Orange Cnty 1	1/0/89	6	-999
Orange Cnty 1	2/0/89	-888	-999
Orange Cnty 1	3/0/89	-888	-999
Orange Cnty 1	4/0/89	-888	-888
Orange Cnty 1	5/0/89	-888	-888
Orange Cnty 1	6/0/89	-888	-888
Orange Cnty 1	7/0/89	-999	19
Orange Cnty 1	8/0/89	-888	-888
Orange Cnty 1	9/0/89	-888	-888

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CITY NAME	DATE	BENZENE	DEHP
Orange Cnty 1	10/0/89	-888	-999
Orange Cnty 1	11/0/89	-888	20
Orange Cnty 1	12/0/89	-888	-888
Orange Cnty 2	1/0/89	-999	-999
Orange Cnty 2	2/0/89	-888	-888
Orange Cnty 2	3/0/89	-888	-888
Orange Cnty 2	4/0/89	-888	-888
Orange Cnty 2	5/0/89	-888	-888
Orange Cnty 2	6/0/89	-888	-888
Orange Cnty 2	7/0/89	-999	25
Orange Cnty 2	8/0/89	-888	-888
Orange Cnty 2	9/0/89	-888	-888
Orange Cnty 2	10/0/89	-888	40
Orange Cnty 2	11/0/89	-888	66
Orange Cnty 2	12/0/89	-888	-888
Orange Cnty 1	1/0/90	-888	26
Orange Cnty 1	2/0/90	-888	4.2
Orange Cnty 1	3/0/90	-888	-888
Orange Cnty 1	4/0/90	-888	-999
Orange Cnty 1	5/0/90	-888	4.2
Orange Cnty 1	6/0/90	-888	-888
Orange Cnty 1	7/0/90	-888	-999
Orange Cnty 1	8/0/90	-888	-888
Orange Cnty 1	9/0/90	-888	-888
Orange Cnty 1	10/0/90	-888	-999
Orange Cnty 1	11/0/90	-888	-888
Orange Cnty 1	12/0/90	-888	-888
Orange Cnty 2	1/0/90	-888	26
Orange Cnty 2	2/0/90	-888	26
Orange Cnty 2	3/0/90	-888	-888
Orange Cnty 2	4/0/90	-888	-999
Orange Cnty 2	5/0/90	-888	-999
Orange Cnty 2	6/0/90	-888	-888
Orange Cnty 2	7/0/90	-888	-999
Orange Cnty 2	8/0/90	-888	-999
Orange Cnty 2	9/0/90	-888	-888
Orange Cnty 2	10/0/90	-888	35
Orange Cnty 2	11/0/90	-888	-888
Orange Cnty 2	12/0/90	-888	-888
Orange Cnty 1	1/0/91	-888	4.2
Orange Cnty 1	2/0/91	-888	4.4
Orange Cnty 1	3/0/91	-888	-888
Orange Cnty 1	4/0/91	-888	9
Orange Cnty 1	5/0/91	-888	3
Orange Cnty 1	6/0/91	-888	-888
Orange Cnty 1	7/0/91	-888	27
Orange Cnty 1	8/0/91	-888	-888
Orange Cnty 1	9/0/91	-888	2.1
Orange Cnty 1	10/0/91	-20	28
Orange Cnty 1	11/0/91	-888	-888
Orange Cnty 1	12/0/91	-100	7.1
Orange Cnty 2	1/0/91	-888	14
Orange Cnty 2	2/0/91	-888	6
Orange Cnty 2	3/0/91	-888	-888
Orange Cnty 2	4/0/91	-888	13
Orange Cnty 2	5/0/91	-888	4
Orange Cnty 2	6/0/91	-888	-888
Orange Cnty 2	7/0/91	-888	-999
Orange Cnty 2	8/0/91	-888	-888
Orange Cnty 2	9/0/91	-888	5.3
Orange Cnty 2	10/0/91	-20	11
Orange Cnty 2	11/0/91	-888	-888
Orange Cnty 2	12/0/91	-100	-11
Orange Cnty 1	1/0/92	-50	23
Orange Cnty 1	2/0/92	-30	4.8
Orange Cnty 1	3/0/92	-888	-888
Orange Cnty 1	4/0/92	-10	18
Orange Cnty 1	5/0/92	-30	-20
Orange Cnty 1	6/0/92	-888	-888

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CITY NAME	DATE	BENZENE	DEHP
Orange Cnty 1	7/0/92	-20	13
Orange Cnty 1	8/0/92	-888	-888
Orange Cnty 1	9/0/92	-20	19
Orange Cnty 1	10/13/92	-0.05	14
Orange Cnty 2	1/0/92	-50	23
Orange Cnty 2	2/0/92	-30	5.8
Orange Cnty 2	3/0/92	-888	-888
Orange Cnty 2	4/0/92	-20	20
Orange Cnty 2	5/0/92	-30	-20
Orange Cnty 2	6/0/92	-888	-888
Orange Cnty 2	7/0/92	-20	-3.3
Orange Cnty 2	8/0/92	-888	-888
Orange Cnty 2	9/0/92	-20	14
Orange Cnty 2	10/13/92	-0.05	18
Orange Cnty	3/23/93	-888	-888
Orange Cnty	3/23/93	-888	-888
Oroville	08/25/92	-888	-888
Palo Alto	09/23/92	-888	-888
Palo Alto	11/01/90	-888	-888
Palo Alto	3/17/93	-888	-888
Palo Alto	3/17/93	-888	-888
Redding - CC		-999	33
Redding - SW		-999	-999
Redding - CC		-888	16
Redding	01/02/91	-0.2	-20
Redding - CC	06/12/05	-888	-888
Redding - CC	06/13/05	-888	-888
Redding - CC	06/25/92	-999	-999
Redding - CC	08/28/89	-888	38
Redding - CC	12/18/90	-888	-20
Redding	12/23/91	-999	21
Redding	3/3/93	-888	-888
Redding	3/10/93	-888	-888
Rialto	3/1/92	-888	-888
Rialto	6/1/92	-888	-888
Rialto	9/1/92	-888	-888
Rialto	12/1/92	-888	-888
Rialto	3/19/93	-888	-888
Rialto	3/22/93	-888	-888
Riverside	06/12/05	-888	-888
Riverside	6/25/92	-999	63
Riverside	7/20/92	-888	-888
Riverside	7/20/92	-888	-888
Riverside	7/20/92	-888	-888
Riverside	7/20/92	-888	-888
Riverside	7/20/92	-888	-888
Riverside	12/4/92	-999	20
Riverside	3/8/93	-888	-888
Riverside	3/15/93	-888	-888
Running Springs	02/06/91	-888	-888
Sacto Regional	06/13/05	-888	-888
Sacto Regional	3/22/89	-888	-888
Sacto Regional	4/9/90	-888	-888
Sacto Regional	8/8/90	-888	-888
Sacto Regional	10/18/90	-888	-888
Sacto Regional	1/24/91	-888	-888
Sacto Regional	4/10/91	-888	-888
Sacto Regional	7/10/91	-888	-888
Sacto Regional	11/1/91	-888	-888
Sacto Regional	3/10/93	-888	-888
Sacto Regional	3/17/93	-888	-888
San Diego	1989avg	-888	-888
San Diego	1990avg	-888	-888
San Diego	1/5/89	-888	-888
San Diego	1/5/89	-888	-888
San Diego	1/5/89	-888	-888
San Diego	2/3/89	-888	-888
San Diego	3/10/89	-888	-888
San Diego	4/10/89	-888	-888

-888 = NOT ANALYZED; -999 = NOT DETECTED; Other negative numbers are detection limits

CITY NAME	DATE	BENZENE	DEHP
San Diego	5/17/89	-888	-888
San Diego	5/17/89	-888	-888
San Diego	5/17/89	-888	-888
San Diego	6/7/89	-888	-888
San Diego	7/1/89	-888	-888
San Diego	7/19/89	-888	-888
San Diego	7/19/89	-888	-888
San Diego	7/19/89	-888	-888
San Diego	7/19/89	-888	-888
San Diego	8/24/89	-888	-888
San Diego	9/20/89	-888	-888
San Diego	9/22/89	-999	29.5
San Diego	10/5/89	-888	-888
San Diego	11/28/89	-888	-888
San Diego	12/12/89	-888	-888
San Diego	12/20/89	-888	-888
San Diego	1/10/90	-888	-888
San Diego	1/10/90	-888	-888
San Diego	2/14/90	-888	-888
San Diego	2/14/90	-888	-888
San Diego	4/12/90	-888	-888
San Diego	4/12/90	-888	-888
San Diego	5/30/90	-888	-888
San Diego	5/30/90	-888	-888
San Diego	6/27/90	-888	-888
San Diego	6/27/90	-888	-888
San Diego	9/5/90	-888	-888
San Diego	9/5/90	-999	13.1
San Diego	9/5/90	-888	-888
San Diego	11/6/90	-888	-888
San Diego	11/6/90	-888	-888
San Diego	12/12/90	-888	-888
San Diego	12/12/90	-888	-888
San Diego	1/15/91	-888	-888
San Diego	1/15/91	-888	-888
San Diego	1/15/91	-888	-888
San Diego	3/7/91	-888	-888
San Diego	3/7/91	-888	-888
San Diego	4/8/91	-888	-888
San Diego	4/8/91	-888	-888
San Diego	6/26/91	-888	-888
San Diego	6/26/91	-888	-888
San Diego	8/22/91	-888	-888
San Diego	8/22/91	-999	53.5
San Diego	8/22/91	-888	-888
San Diego	10/28/91	-888	-888
San Diego	10/28/91	-888	-888
San Diego	10/28/91	-888	-888
San Diego	10/28/91	-888	-888
San Diego	3/12/93	-888	-888
San Diego	3/19/93	-888	-888
San Jose	3/10/93	-888	-888
San Jose	3/10/93	-888	-888
San Jose	11/24/86	-999	3.3
San Jose	9/30/88	-999	24
San Jose	8/30/91	-999	9
San Luis Obispo	3/16/93	-888	-888
San Luis Obispo	10/01/91	-999	30
Santa Barbara	8/11/92	-999	20
Santa Barbara	12/1/92	-888	-888
Santa Barbara	1/0/92	-888	-888
Santa Barbara	4/0/92	-888	-888
Santa Barbara	7/0/92	-888	-888
Santa Barbara	1/0/91	-888	-888
Santa Barbara	4/0/91	-888	-888
Santa Barbara	7/0/91	-888	-888
Santa Barbara	1/0/90	-888	-888
Santa Barbara	4/0/90	-888	-888
Santa Barbara	7/0/90	-888	-888

-888 = NOT ANALYZED; -999 = NOT DETECTED; Other negative numbers are detection limits

CITY NAME	DATE	BENZENE	DEHP
Santa Barbara	1/0/89	-888	-888
Santa Barbara	4/0/89	-888	-888
Santa Barbara	7/0/89	-888	-888
Santa Barbara	10/0/89	-888	-888
Santa Barbara	10/0/90	-888	-888
Santa Barbara	10/0/91	-888	-888
Santa Barbara	10/0/92	-888	-888
Santa Barbara	3/23/92	-888	-888
Santa Barbara	3/3/93	-888	-888
Santa Barbara	3/11/93	-888	-888
Santa Rosa	10/7/91	-888	-888
Santa Rosa	4/8/91	-888	-888
Santa Rosa	7/13/92	-888	-888
Santa Rosa	1/11/93	-888	-888
Santa Rosa	10/7/92	-888	-888
Santa Rosa	3/4/93	-888	-888
Santa Rosa	3/11/93	-888	-888
SouthTahoe	03/09/89	-888	-888
South Tahoe	3/12/93	-888	-888
South Tahoe	3/19/93	-888	-888
Taft	07/20/90	-888	-888
Taft	07/20/90	-888	-888
Taft	07/20/90	-888	-888
Thousand Oaks	3/4/93	-888	-888
Thousand Oaks	3/17/93	-888	-888
Tracy	06/26/91	-888	-888
Tracy	07/01/92	-888	-888
Tracy	08/17/90	-888	-888
Tracy	08/17/90	-888	-888
Tracy	3/17/93	-888	-888
Tracy	3/17/93	-888	-888
Vallejo	04/01/90	-888	-888
Vallejo	06/05/92	-888	-888
Vallejo	12/01/89	-888	-888
Vallejo	12/01/90	-888	-888
Vallejo	3/4/93	-888	-888
Vallejo	3/11/93	-888	-888
West Contra Costa	07/31/90	-888	0.17
West Contra Costa	3/10/93	-888	-888
West Contra Costa	3/11/93	-888	-888
West Sacramento	1/17/89	-0.2	-10
West Sacramento	12/8/89	-888	-888
West Sacramento	3/15/90	-888	-888
West Sacramento	7/20/90	-888	-888
West Sacramento	11/27/90	-888	-888
West Sacramento	5/8/91	-888	-888
West Sacramento	7/17/91	-888	-888
West Sacramento	3/5/91	-888	-888
West Sacramento	4/29/91	-888	-888
West Sacramento	9/11/91	-888	-888
West Sacramento	7/20/89	-888	-888
West Sacramento	3/1/93	-888	-888
West Sacramento	3/1/93	-888	-888
COUNT: 397		1	1

-888 = NOT ANALYZED; -999 = NOT DETECTED; Other negative numbers are detection limits

APPENDIX 7

Statistics
for
Benzene and DEHP

(dry weights)

Dry Weight Data: Statistics for Benzene and DEHP

	BENZENE	DEHP
AVG:	2.153	58.597
COUNT:	3.000	53.000
MIN:	0.220	0.009
MAX:	6.000	810.000
STD:	2.720	133.455
VAR:	7.398	17810.317

APPENDIX 8

FACT SHEETS

Land Application

and

Composting

POTWs Disposing of Sludge by Land Application

CITY NAME	PERMIT_NO	
Corning	CA0004995	
Delta Diablo	CA0038547	
Eureka	CA0024449	
Manteca	CA0081558	
Modesto	CA0079103	
Oroville	CA0079235	
San Luis Obispo	CA0049224	
Santa Barbara	CA0048143	
Tracy	CA0079154	
Vallejo	CA0037699	
		Percent of Total
No. POTWs:	10	23.8
Total No. SIUs:	57	57
Total No. CIUs:	21	21
Total Flow (MGD):	77.31	77.3

POTWs Disposing of Sludge by Composting

CITY NAME	PERMIT_NO
Chino Basin 1	CA0105279
Chino Basin 2	CA0105287
Encina	CA0107395
Fallbrook	CA0108031
Orange County	CA0110604
Rialto	CA0105295
Riverside	CA0105350
Running Springs	N/A
San Diego	CA0107409

		Percent of Total
No. POTWs:	9	21.4
Total No. SIUs:	637	50.9
Total No. CIUs:	459	50.5
Total Flow (MGD):	502.4	50.9

PERMIT_NO: **CA0004995**

Facility Name: **Corning Waste Water Treatment Plant**

Plant Type: **secondary**

CIUS:
SIUS:

Avg Flow MGD: **1.08**
% IUs Contribut: **34.0**
% Domestic: **66.0**

Disposal Type 1: **Land application**
Amount Disposed: **200**
Units: **CY**
In use since: **1990**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **NO**

LAB: **CH2M Hill Env.Lab**

Other wastewtr?: **YES**

Recv Septage?: **NO**
Domestic only?: **N/A**
Grease?: **N/A**
Other septage?: **N/A**

1st LEVEL: **Aerobic digestion**

2nd LEVEL: **Gravity thickening**

3rd LEVEL: **Drying beds**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **NO**

CITY NAME: **Corning**

Disposal method changes are currently under review.
Wastewater is received from olive processing.
Pretreatment program is pending.

PERMIT_NO: **CA0038547**

Facility Name: **Delta Diablo Sanitation District**

Plant Type: **secondary**

CIUS: **8**
SIUS: **17**

Avg Flow MGD: **9.60**
% IUs Contribut: **5.0**
% Domestic: **95.0**

Disposal Type 1: **Land application**
Amount Disposed: **10421**
Units: **WT**
In use since: **1989**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **YES**

LAB: **Sequoia Lab, Redwood City**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **YES**
Other septage?: **NO**

1st LEVEL: **DAF thickening**

2nd LEVEL: **Anaerobic digestion**

3rd LEVEL: **Centrifuge**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **Delta Diablo**

1,772 dry tons sludge disposed. Disposal methods are being changed to meet 503 regulations.

PERMIT_NO: **CA0024449**

Facility Name: **Elk River Water Treatment Plant**

Plant Type: **secondary**

CIUS: **0**
SIUS: **5**

Avg Flow MGD: **5.24**
% IUs Contribut: **5.0**
% Domestic: **95.0**

Disposal Type 1: **Land application**
Amount Disposed: **9900**
Units: **DCY**
In use since: **1985**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **NO**

LAB: **North Coast Labs, Arcata**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **NO**
Other septage?: **NO**

1st LEVEL: **Anaerobic digestion**

2nd LEVEL: **Facultative lagoons**

3rd LEVEL:

Other sludges?: **YES**
Amt sludge recv: **12000**
3-Units: **GAL/M**

Pretreatment Pr: **YES**

CITY NAME: **Eureka**

Will dredge lagoon in April/May. Receives sludge from Loleta Sanitary District.

PERMIT_NO: **CA0081558**

Facility Name: **Manteca Waste Water Quality Control Facility**

Plant Type: **secondary**

CIUS: **1**
SIUS: **2**

Avg Flow MGD: **4.54**
% IUs Contribut: **10.0**
% Domestic: **90.0**

Disposal Type 1: **Land application**
Amount Disposed: **1462**
Units: **CY**
In use since: **1972**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **NO**

LAB: **FGL Environ., Stockton, A&L Western Ag., Modesto**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **NO**
Other septage?: **NO**

1st LEVEL: **Thickened**

2nd LEVEL: **Anaerobic digestion**

3rd LEVEL: **Drying beds**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **NO**

CITY NAME: **Manteca**

Sludge is applied to agricultural land.
Pretreatment program is pending.

PERMIT_NO: **CA0049224**

Facility Name: **San Luis Obispo Water Reclamation Facility**

Plant Type: **secondary**

CIUS: **2**
SIUS: **4**

Avg Flow MGD: **3.60**
% IUs Contribut: **0.7**
% Domestic: **99.3**

Disposal Type 1: **Land application**
Amount Disposed: **3000**
Units: **DCY**
In use since: **1989**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **NO**

LAB: **Fruit Growers Lab, Ventura**

Other wastewtr?: **NO**

Recv Septage?: **NO**
Domestic only?: **N/A**
Grease?: **N/A**
Other septage?: **N/A**

1st LEVEL: **Anaerobic digestion**

2nd LEVEL: **Drying Beds**

3rd LEVEL: **Stockpiled**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **San Luis Obispo**

Haul sludge to Merced Co.

PERMIT_NO: **CA0048143**

Facility Name: **El Estero Wastewater Treatment Plant**

Plant Type: **tertiary**

CIUS: **3**
SIUS: **4**

Avg Flow MGD: **8.00**
% IUs Contribut: **16.0**
% Domestic: **84.0**

Disposal Type 1: **Land application**
Amount Disposed: **8400**
Units: **WT**
In use since: **1974**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **YES**

LAB: **inhouse; Coast to Coast (organics)**

Other wastewtr?: **NO**

Recv Septage?: **NO**
Domestic only?: **N/A**
Grease?: **N/A**
Other septage?: **N/A**

1st LEVEL: **Thickened**

2nd LEVEL: **Anaerobic digestion**

3rd LEVEL: **Belt press**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **Santa Barbara**

12.000 dry cubic yards entered in amount disposed column also; Some procedural changes are proposed for disposal methods.

PERMIT_NO: **CA0079103**

Facility Name: **Modesto Water Quality Control Facility**

Plant Type: **secondary**

CIUS: **4**
SIUS: **17**

Avg Flow MGD: **25.80**
% IUs Contribut: **31.0**
% Domestic: **69.0**

Disposal Type 1: **Land application**
Amount Disposed: **9000**
Units: **DCY**
In use since: **1962**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **NO**

LAB: **JL Analytical Labs, Modesto; APPL Inc, Fresno**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **Dom/Ind**
Grease?: **NO**
Other septage?: **YES**

1st LEVEL: **Anaerobic digestion**

2nd LEVEL: **Drying beds**

3rd LEVEL:

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **Modesto**

Hauled waste is received from an industrial aluminum extruder.

PERMIT_NO: **CA0079235**

Facility Name: **Oroville Region Sewerage Commission**

Plant Type: **primary**

CIUS: **2**
SIUS: **2**

Avg Flow MGD: **3.00**
% IUs Contribut: **1.0**
% Domestic: **99.0**

Disposal Type 1: **Land application**
Amount Disposed: **1600**
Units: **CY**
In use since: **1988**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **NO**

LAB: **Thermo-Analytical, Inc., Monrovia**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **NO**
Other septage?: **NO**

1st LEVEL: **Aerobic digestion**

2nd LEVEL: **Storage ponds**

3rd LEVEL: **Drying beds**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **Oroville**

SAMPLOCATE:

PERMIT_NO: **CA0079154**

Facility Name: **City of Tracy Waste Water Treatment Plant**

Plant Type: **secondary**

CIUS: **0**
SIUS: **2**

Avg Flow MGD: **5.45**
% IUs Contribut: **19.0**
% Domestic: **81.0**

Disposal Type 1: **Land application**
Amount Disposed: **1600**
Units: **DT**
In use since: **1989**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **NO**

LAB: **CH2M Hill Env.Lab,Redding; FGL Env., Stockton**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **NO**
Other septage?: **NO**

1st LEVEL: **DAF thickening**

2nd LEVEL: **Anaerobic digestion**

3rd LEVEL: **Air dried**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **Tracy**

3000 dry cubic yards were entered for disposal amount.

PERMIT_NO: CA0037699

Facility Name: Vallejo Sanitation & Flood Control

Plant Type: secondary

CIUS: 1
SIUS: 4

Avg Flow MGD: 11.00
% IUs Contribut: 5.0
% Domestic: 65.0

Disposal Type 1: Land application
Amount Disposed: 29862
Units: DCY
In use since:

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: NO

LAB: CAL Test Labs, Napa

Other wastewtr?: NO

Recv Septage?: YES
Domestic only?: YES
Grease?: NO
Other septage?: NO

1st LEVEL: Lime stabilization

2nd LEVEL: Thickened

3rd LEVEL: Vacuum filtration

Other sludges?: NO
Amt sludge recv:
3-Units:

Pretreatment Pr: YES

CITY NAME: Vallejo

Sludge goes to Tubbs Island agricultural project.

PERMIT_NO: **CA0105279**

Facility Name: **Chino Basin Regional Plant #1**

Plant Type: **tertiary**

CIUS: **28**
SIUS: **72**

Avg Flow MGD: **32.50**
% IUs Contribut: **5.0**
% Domestic: **95.0**

Disposal Type 1: **Compost**
Amount Disposed: **54000**
Units: **WT**
In use since: **1991**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **YES**

LAB: **B & C Analytical Labs, Anaheim**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **NO**
Other septage?: **NO**

1st LEVEL: **Gravity,DAF thicken**

2nd LEVEL: **Anaerobic digestion**

3rd LEVEL: **Belt press**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **Chino Basin 1**

Changes are anticipated in disposal methods due to 503 regulations.

PERMIT_NO: **CA0105287**

Facility Name: **Chino Basin Regional Plant #2**

Plant Type: **tertiary**

CIUS: **5**
SIUS: **2**

Avg Flow MGD: **5.10**
% IUs Contribut: **3.0**
% Domestic: **97.0**

Disposal Type 1: **Compost**
Amount Disposed: **12000**
Units: **WCY**
In use since: **1991**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **YES**

LAB: **B & C Analytical Labs, Anaheim**

Other wastewtr?: **NO**

Recv Septage?: **NO**
Domestic only?: **N/A**
Grease?: **N/A**
Other septage?: **N/A**

1st LEVEL: **Gravity thickening**

2nd LEVEL: **Anaerobic digestion**

3rd LEVEL: **Belt press**

Other sludges?: **YES**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **Chino Basin 2**

Changes are anticipated in disposal methods due to 503 regulations.

PERMIT_NO: **CA0107395**

Facility Name: **Encina Water Pollution Control Facility**

Plant Type: **secondary**

CIUS: **32**
SIUS: **14**

Avg Flow MGD: **19.00**
% IUs Contribut: **4.0**
% Domestic: **96.0**

Disposal Type 1: **Compost**
Amount Disposed: **21000**
Units: **WT**
In use since:

Disposal Type 2: **Land application**
2-Amnt Disposed: **2400**
2-Units: **WTY**
2-In use since: **5**

Plan changes?: **YES**

LAB: **Associated Labs, Orange, and inhouse**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **NO**
Other septage?: **YES**

1st LEVEL: **Thickening**

2nd LEVEL: **Anaerobic digestion**

3rd LEVEL: **Belt filter press**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **Encina**

Currently also haul 600 wt/y to landfill, but as of 7/93 will exclusively compost. Receive chemical toilet waste.

PERMIT_NO: **CA0108031**

Facility Name: **Fallbrook Sanitary District**

Plant Type: **tertiary**

CIUS: **0**
SIUS: **0**

Avg Flow MGD: **1.50**
% IUs Contribut: **1.0**
% Domestic: **99.0**

Disposal Type 1: **Compost**
Amount Disposed: **7.087**
Units: **MG**
In use since: **1993**

Disposal Type 2: **Thermophilic; vermicompost**
2-Amnt Disposed: **7.087**
2-Units:
2-In use since: **1986**

Plan changes?: **YES**

LAB: **Agri Service, Vista; McDonald Stephens, Laguna Hills**

Other wastewtr?: **NO**

Recv Septage?: **NO**
Domestic only?: **N/A**
Grease?: **N/A**
Other septage?: **N/A**

1st LEVEL: **Aerobic digestion**

2nd LEVEL: **Filter press**

3rd LEVEL:

Other sludges?: **YES**
Amt sludge recv: **30000**
3-Units: **GPW**

Pretreatment Pr: **NO**

CITY NAME: **Fallbrook**

Receives sludge from Capistrano Beach but this goes to drying bed only; switched from vermicomposting to composting in December 92. Sludge disposed = 1% solids.

PERMIT_NO: **CA0110604**

Facility Name: **Orange County Plant #1 & 2**

Plant Type: **secondary**

CIUS: **275**
SIUS: **400**

Avg Flow MGD: **225.00**
% IUs Contribut: **20.0**
% Domestic: **80.0**

Disposal Type 1: **Compost**
Amount Disposed: **161000**
Units: **WT**
In use since: **1987**

Disposal Type 2: **Land Application**
2-Amnt Disposed: **40000**
2-Units: **WT**
2-In use since: **1991**

Plan changes?: **NO**

LAB: **inhouse; Montgomery, Pasadena; McDonald-Stevens,Laguna Hills**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **YES**
Other septage?: **YES**

1st LEVEL: **Anaerobic digestion**

2nd LEVEL: **Belt press**

3rd LEVEL:

Other sludges?: **YES**
Amt sludge recv: **2.5**
3-Units: **MGD**

Pretreatment Pr: **YES**

CITY NAME: **Orange County**

Waste is received from Irvine Ranch Water District.

PERMIT_NO: **CA0105295**

Facility Name: **Rialto Municipal Wastewater Treatment Facility**

Plant Type: **tertiary**

CIUS: **1**
SIUS: **10**

Avg Flow MGD: **5.75**
% IUs Contribut: **5.0**
% Domestic: **95.0**

Disposal Type 1: **Compost**
Amount Disposed: **1300**
Units: **DT**
In use since: **1990**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **NO**

LAB: **Babcock & Sons, Riverside**

Other wastewtr?: **NO**

Recv Septage?: **NO**
Domestic only?: **N/A**
Grease?: **N/A**
Other septage?: **N/A**

1st LEVEL: **Thickened**

2nd LEVEL: **Anaerobic digestion**

3rd LEVEL: **Belt press**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **Rialto**

SAMPLOCATE:

PERMIT_NO: **CA0105350**

Facility Name: **Riverside Water Quality Control Plant**

Plant Type: **tertiary**

CIUS: **7**
SIUS: **17**

Avg Flow MGD: **29.40**
% IUs Contribut: **7.9**
% Domestic: **92.1**

Disposal Type 1: **Compost**
Amount Disposed: **7000**
Units: **TONS**
In use since: **1990**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **NO**

LAB: **Babcock & Sons, Riverside, Enviro-Chem, Pomona**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **NO**
Other septage?: **NO**

1st LEVEL: **Anaerobic digestion**

2nd LEVEL: **Belt press**

3rd LEVEL: **Drying beds**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **Riverside**

Commercially composted and marketed.

PERMIT_NO: **N/A**

Facility Name: **Running Springs Water Pollution Control Plant**

Plant Type: **secondary**

CIUS: **0**
SIUS: **0**

Avg Flow MGD: **0.55**
% IUs Contribut: **0.0**
% Domestic: **100.0**

Disposal Type 1: **Compost**
Amount Disposed: **100**
Units: **CY**
In use since: **1990**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **NO**

LAB: **Babcock & Sons, Riverside**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **NO**
Other septage?: **NO**

1st LEVEL: **Aerobic digestion**

2nd LEVEL: **Belt press**

3rd LEVEL: **Air dried**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **NO**

CITY NAME: **Running Springs**

SAMPLOCATE:

PERMIT_NO: CA0107409

Facility Name: Point Loma Waste Water Treatment Plant, San Diego

Plant Type: adv primary

CIUS: 108
SIUS: 130

Avg Flow MGD: 182.00
% IUs Contribut: 5.0
% Domestic: 92.0

Disposal Type 1: Compost
Amount Disposed: 188742
Units: WT
In use since: 1989

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: NO

LAB: inhouse

Other wastewtr?: NO

Recv Septage?: YES
Domestic only?: Dom/Com
Grease?: NO
Other septage?: YES

1st LEVEL: Anaerobic digestion

2nd LEVEL: Drying bed or belt pr

3rd LEVEL: Stockpiled -discont.1!

Other sludges?: YES
Amt sludge recv:
3-Units:

Pretreatment Pr: YES

CITY NAME: San Diego

Offsite stockpiling; only small amts of other POTW's sludges received.

APPENDIX 9

FACT SHEETS

Landfilling

POTWs Disposing of Sludge to Landfills

CITY_NAME	PERMIT_NO
Anderson	CA0077704
Dunsmuir	CA0078441
EBMUD	CA0037702
Monterey	CA0048551
Napa	CA0037575
Redding - CC	CA0079731
Redding - SW	CA0082589
Santa Rosa	CA0022764
Tahoe/Truckee	N/A
Thousand Oaks	CA0056294
West Contra Costa	CA0038539
West Sacramento	CA0079171

		Percent of Total
No. POTWs:	12	28.6
Total No. SIUs:	172	13.7
Total No. CIUs:	138	15.2
Total Flow (MGD):	147.74	15.0

PERMIT_NO: **CA0077704**

Facility Name: **Anderson Water Pollution Control Plant**

Plant Type: **secondary**

CIUS: **0**
SIUS: **0**

Avg Flow MGD: **1.35**
% IUs Contribut: **0.0**
% Domestic: **100.0**

Disposal Type 1: **Landfill**
Amount Disposed: **1036**
Units: **DCY**
In use since: **1977**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **NO**

LAB: **CH2M Hill, Redding**

Other wastewtr?: **NO**

Recv Septage?: **NO**
Domestic only?: **N/A**
Grease?: **N/A**
Other septage?: **N/A**

1st LEVEL: **Aerobic digestion**

2nd LEVEL: **Pond storage**

3rd LEVEL: **Drying beds**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **NO**

CITY_COUNT: **Anderson**

Sludge is in lagoons; it will be decanted in June or July. No representative sample is available.

PERMIT_NO: **CA0078441**

Facility Name: **Dunsmuir Wastewater Treatment Facility**

Plant Type: **secondary**

CIUS: **0**
SIUS: **0**

Avg Flow MGD: **0.29**
% IUs Contribut: **0.0**
% Domestic: **100.0**

Disposal Type 1: **Landfill**
Amount Disposed: **46**
Units: **WT**
In use since: **1977**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **NO**

LAB: **inhouse lab; CH2M Hill**

Other wastewtr?: **NO**

Recv Septage?: **NO**
Domestic only?: **N/A**
Grease?: **N/A**
Other septage?: **N/A**

1st LEVEL: **Aerobic digestion**

2nd LEVEL: **Sludge lagoons**

3rd LEVEL:

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **NO**

CITY_COUNT: **Dunsmuir**

SAMPLOCATE:

PERMIT_NO: **CA0037702**

Facility Name: **EBMUD Main Treatment Plant**

Plant Type: **secondary**

CIUS: **79**
SIUS: **124**

Avg Flow MGD: **70.00**
% IUs Contribut: **0.8**
% Domestic: **99.0**

Disposal Type 1: **Landfill**
Amount Disposed: **59034**
Units: **CY**
In use since: **1970**

Disposal Type 2: **Compost**
2-Amnt Disposed: **26778**
2-Units: **CY**
2-In use since: **1982**

Plan changes?: **YES**

LAB: **inhouse; Curtis Tomkins LTD Analyt.Labs, Berkeley**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **NO**
Other septage?: **YES**

1st LEVEL: **Thickening**

2nd LEVEL: **Anaerobic digestion**

3rd LEVEL: **Centrifuge**

Other sludges?: **YES**
Amt sludge recv: **26**
3-Units: **CY**

Pretreatment Pr: **YES**

CITY NAME: **EBMUD**

The disposal options are 70% Landfill and 30% Compost. Disposal methods being changed due to land application regulation changes. Chemical toilet wastes are received. Reclamation water plant alum sludge is received. Sludge is disposed ot Novato landfill.

PERMIT_NO: **CA0048551**

Facility Name: **Monterey Regional Waste Water Treatment Plant**

Plant Type: **secondary**.

CIUS: **3**
SIUS: **8**

Avg Flow MGD: **19.00**
% IUs Contribut: **8.0**
% Domestic: **92.0**

Disposal Type 1: **Landfill**
Amount Disposed: **1466**
Units: **WT**
In use since: **1990**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **NO**

LAB: **Coast to Coast Analytical Labs, San Jose**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **Dom/Com**
Grease?: **NO**
Other septage?: **YES**

1st LEVEL: **Thickened**

2nd LEVEL: **Anaerobic digestion**

3rd LEVEL: **Drying beds**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **Monterey**

Sludge disposal method is changing to land application. Waste is received from chemical toilets. Sludge is disposed to Marina landfill.

PERMIT_NO: **CA0037575**

Facility Name: **Napa Sanitation District, Imola Plant**

Plant Type:

CIUS: **1**
SIUS: **2**

Avg Flow MGD: **8.00**
% IUs Contribut: **17.0**
% Domestic: **83.0**

Disposal Type 1: **Landfill**
Amount Disposed: **1400**
Units: **WT**
In use since: **1986**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **YES**

LAB: **Cal Test Labs, Napa**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **Dom/Com**
Grease?:
Other septage?: **YES**

1st LEVEL: **Anaerobic digestion**

2nd LEVEL: **Drying beds**

3rd LEVEL:

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY_COUNT: **Napa**

Sludge is in lagoons; 1,000 dry tons sludge disposed. Sludge disposal method is changing to land application. Waste is also received from wineries and restaurants. Sludge is disposed to Redwood landfill.

PERMIT_NO: **CA0079731**

Facility Name: **Clear Creek Waste Water Treatment Plant, Redding**

Plant Type: **tertiary**

CIUS: **1**
SIUS: **6**

Avg Flow MGD: **7.20**
% IUs Contribut: **2.0**
% Domestic: **98.0**

Disposal Type 1: **Landfill**
Amount Disposed: **3700**
Units: **DT**
In use since: **1979**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **YES**

LAB: **CH2M Hill, Redding; Enesco,W.Sacto; AnLab,Sacto; inhouse lal**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **N/A**
Other septage?: **N/A**

1st LEVEL: **Anaerobic/lagoon**

2nd LEVEL: **Plate & frame press**

3rd LEVEL: **Air dried**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY_COUNT: **Redding**

Disposal method is changing to composting. Sludge is disposed to Shasta County West Central landfill.

PERMIT_NO: **CA0082589**

Facility Name: **Stillwater Waste Water Treatment Plant, Redding**

Plant Type: **tertiary**

CIUS: **1**
SIUS: **8**

Avg Flow MGD: **1.60**
% IUs Contribut: **6.0**
% Domestic: **94.0**

Disposal Type 1: **Landfill**
Amount Disposed: **550**
Units: **DCY**
In use since: **1991**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **YES**

LAB: **CH2M Hill, Redding; Enesco,W.Sacto; AnLab,Sacto; inhouse lal**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **N/A**
Other septage?: **N/A**

1st LEVEL: **Aerobic digestion**

2nd LEVEL: **Belt press**

3rd LEVEL:

Other sludges?:
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY_COUNT: **Redding**

Disposal method is changing to composting.

PERMIT_NO: **CA0022764**

Facility Name: **Laguna Waste Water Treatment Plant**

Plant Type: **tertiary**

CIUS: **28**
SIUS: **40**

Avg Flow MGD: **17.80**
% IUs Contribut: **4.0**
% Domestic: **96.0**

Disposal Type 1: **Landfill**
Amount Disposed: **4500**
Units: **DT**
In use since: **1986**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **YES**

LAB: **CalTest, Napa**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **N/A**
Other septage?: **N/A**

1st LEVEL: **Anaerobic digestion**

2nd LEVEL: **Belt press**

3rd LEVEL:

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY_COUNT: **Santa Rosa**

Anticipate change to sludge composting.

PERMIT_NO: N/A

Facility Name: Tahoe/Truckee Sanitation District

Plant Type: tertiary

CIUS: 0
SIUS: 0

Avg Flow MGD: 3.65
% IUs Contribut: 0.0
% Domestic: 100.0

Disposal Type 1: Landfill
Amount Disposed: 900
Units: DT
In use since: 1978

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: YES

LAB: Anlab, Sacramento

Other wastewtr?: NO

Recv Septage?: YES
Domestic only?: YES
Grease?: YES
Other septage?: NO

1st LEVEL: Anaerobic digestion

2nd LEVEL: Filter press

3rd LEVEL:

Other sludges?: NO
Amt sludge recv:
3-Units:

Pretreatment Pr: YES

CITY NAME: Tahoe/Truckee

Landfilled material is 40-48% dry cake. Sludge disposal method may change to composting.

PERMIT_NO: **CA0056294**

Facility Name: **Hill Canyon Waste Water Treatment Plant**

Plant Type: **tertiary**

CIUS: **15**
SIUS: **22**

Avg Flow MGD: **8.30**
% IUs Contribut: **5.0**
% Domestic: **7.9**

Disposal Type 1: **Landfill**
Amount Disposed: **1800**
Units: **DT**
In use since: **1972**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **YES**

LAB: **HCWWTP Lab, Camarillo**

Other wastewtr?: **NO**

Recv Septage?: **NO**
Domestic only?: **N/A**
Grease?: **N/A**
Other septage?: **N/A**

1st LEVEL:

2nd LEVEL: **Anaerobic digestion**

3rd LEVEL:

Other sludges?: **YES**
Amt sludge recv:
3-Units: **TON/Y**

Pretreatment Pr: **YES**

CITY_COUNT: **Thousand Oaks**

Sludge disposal method will be changing due to economics. Sludge also received from Olsen Road Water Reclamation Plant.

PERMIT_NO: **CA0038539**

Facility Name: **West Contra Costa Sanitary District WPCP**

Plant Type:

CIUS: **0**
SIUS: **0**

Avg Flow MGD: **6.50**
% IUs Contribut: **5.0**
% Domestic: **95.0**

Disposal Type 1: **Landfill**
Amount Disposed:
Units:
In use since:

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?:

LAB: **BC Analytical, Emeryville**

Other wastewtr?:

Recv Septage?:
Domestic only?:
Grease?:
Other septage?:

1st LEVEL:

2nd LEVEL: **Biotreat.**

3rd LEVEL: **Clarification**

Other sludges?:
Amt sludge recv:
3-Units:

Pretreatment Pr:

CITY_COUNT: **West Contra Costa**

SAMPLOCATE:

PERMIT_NO: **CA0079171**

Facility Name: **West Sacramento Wastewater Treatment Plant**

Plant Type: **secondary**

CIUS: **10**
SIUS: **21**

Avg Flow MGD: **4.05**
% IUs Contribut: **35.0**
% Domestic: **65.0**

Disposal Type 1: **Landfill**
Amount Disposed: **13000**
Units: **DT**
In use since:

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **NO**

LAB: **AnLab, Sacramento**

Other wastewtr?: **NO**

Recv Septage?: **NO**
Domestic only?: **N/A**
Grease?: **N/A**
Other septage?: **N/A**

1st LEVEL: **Anaerobic digestion**

2nd LEVEL: **Belt press**

3rd LEVEL:

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **West Sacramento**

Incomplete info on sludge generated.

APPENDIX 10

FACT SHEETS

Surface Disposal

List of POTWs Disposing of Sludge by Surface Disposal

CITY NAME	PERMIT_NO
Dublin/San Ramon	CA0037613
Sacto Regional	CA0077682

Total No. SIUs:	9
Total No. CIUs:	4
Total Flow (MGD):	122.4

PERMIT_NO: **CA0037613**

Facility Name: **Dublin San Ramon Services District Regional WWTF**

Plant Type: **secondary**

CIUS: **4**
SIUS: **9**

Avg Flow MGD: **7.40**
% IUs Contribut: **3.0**
% Domestic: **97.0**

Disposal Type 1: **Surface disposal**
Amount Disposed: **37000**
Units: **CY**
In use since: **1953**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **NO**

LAB: **inhouse lab**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **NO**
Other septage?: **NO**

1st LEVEL: **DAF thickening**

2nd LEVEL: **Anaerobic digestion**

3rd LEVEL: **Facultative lagoons**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **Dublin/San Ramon**

Sludge is injected to dedicated land disposal site.

PERMIT_NO: CA0077682

Facility Name: Sacramento Regional

Plant Type: secondary

CIUS:
SIUS:

Avg Flow MGD: 115.00
% IUs Contribut:
% Domestic:

Disposal Type 1: Surface disposal
Amount Disposed: 18500
Units: DT
In use since:

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?:

LAB:

Other wastewtr?:

Recv Septage?:
Domestic only?:
Grease?:
Other septage?:

1st LEVEL:

2nd LEVEL:

3rd LEVEL:

Other sludges?:
Amt sludge recv:
3-Units:

Pretreatment Pr:

CITY NAME: Sacto Regional

Subsurface injection to dedicated land.

APPENDIX 11

FACT SHEETS

Incineration

List of POTWs Disposing of Sludge by Incineration

CITY NAME	PERMIT_NO
CCCSD	CA0037648
Palo Alto	CA0037834
South Tahoe	CA0105279

Total No. SIUs:	101
Total No. CIUs:	53
Total Flow (MGD):	61.5

PERMIT_NO: **CA0037648**

Facility Name: **Central Contra Costa Sanitation District**

Plant Type: **secondary**

CIUS: **9**
SIUS: **31**

Avg Flow MGD: **35.00**
% IUs Contribut: **19.0**
% Domestic: **81.0**

Disposal Type 1: **Incineration - sludge**
Amount Disposed: **64000**
Units: **WT**
In use since: **1984**

Disposal Type 2: **Landfill - ash**
2-Amnt Disposed: **6776**
2-Units: **DTY**
2-In use since:

Plan changes?: **NO**

LAB: **Cal Test Analytical Lab, Napa and CCCSD In-House**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **Dom/Com**
Grease?: **YES**
Other septage?: **YES**

1st LEVEL: **DAF thickening**

2nd LEVEL: **Centrifuge**

3rd LEVEL: **Incineration**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **CCCSD**

12,800 dry tons sludge disposed; Chemical toilets waste received.

PERMIT_NO: **CA0037834**

Facility Name: **Palo Alto Regional Water Quality Control Plant**

Plant Type: **tertiary**

CIUS: **44**
SIUS: **70**

Avg Flow MGD: **22.00**
% IUs Contribut: **15.0**
% Domestic: **85.0**

Disposal Type 1: **Incineration - sludge**
Amount Disposed: **5475**
Units: **DT**
In use since: **1972**

Disposal Type 2: **Metals reclamation - ash**
2-Amnt Disposed: **1095**
2-Units: **DT**
2-In use since:

Plan changes?: **NO**

LAB: **Sequoia Analytical Labs, Redwood City; inhouse lab**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **YES**
Other septage?: **YES**

1st LEVEL: **Thickened**

2nd LEVEL: **Belt press**

3rd LEVEL: **Incineration**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **Palo Alto**

Waste is received from chemical toilets.

PERMIT_NO: **CA0105279**

Facility Name: **South Tahoe Public Utilities District**

Plant Type: **secondary+**

CIUS: **0**
SIUS: **0**

Avg Flow MGD: **4.50**
% IUs Contribut: **0.0**
% Domestic: **100.0**

Disposal Type 1: **Incineration - sludge**
Amount Disposed: **16000**
Units: **WT**
In use since: **1977**

Disposal Type 2: **Landfill - ash**
2-Amnt Disposed: **400**
2-Units: **DT**
2-In use since: **1977**

Plan changes?: **NO**

LAB: **Anlab, Sacramento**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **NO**
Other septage?: **NO**

1st LEVEL: **Thickened**

2nd LEVEL: **Centrifuge**

3rd LEVEL: **Incineration**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **South Tahoe**

Sludge was identified as hazardous?

APPENDIX 12

FACT SHEETS

Stockpiling and Other Options

POTWs Stockpiling Sludge

CITY_NAME	PERMIT_NO
Bakersfield	N/A
Bakersfield	N/A
Fresno	77-67
San Jose	CA0037842
Taft	CA0080161

		Percent of Total
No. POTWs:	5	11.9
Total No. SIUs:	317	317
Total No. CIUs:	227	227
Total Flow (MGD):	187.64	188

PERMIT_NO: **N/A**

Facility Name: **Bakersfield Plant 2**

Plant Type:

CIUS: **3**
SIUS: **9**

Avg Flow MGD: **17.50**
% IUs Contribut: **2.2**
% Domestic: **97.8**

Disposal Type 1: **Stockpile**
Amount Disposed:
Units:
In use since:

Disposal Type 2: **Land application**
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?:

LAB: **Agric.&Priority Poll.Labs,Inc**

Other wastewtr?: **YES**

Recv Septage?:
Domestic only?:
Grease?:
Other septage?:

1st LEVEL: **Settling Tanks**

2nd LEVEL: **Anaerobic digestion**

3rd LEVEL:

Other sludges?:
Amt sludge recv:
3-Units:

Pretreatment Pr:

CITY NAME: **Bakersfield**

SAMPLOCATE:

PERMIT_NO: **N/A**

Facility Name: **Bakersfield Plant 3**

Plant Type:

CIUS: **1**
SIUS: **12**

Avg Flow MGD: **8.30**
% IUs Contribut: **2.2**
% Domestic: **97.8**

Disposal Type 1: **Stockpile**
Amount Disposed:
Units:
In use since:

Disposal Type 2: **Land application**
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?:

LAB:

Other wastewtr?:

Recv Septage?:
Domestic only?:
Grease?:
Other septage?:

1st LEVEL: **Settling Tanks**

2nd LEVEL: **Anaerobic digestion**

3rd LEVEL:

Other sludges?:
Amt sludge recv:
3-Units:

Pretreatment Pr:

CITY NAME: **Bakersfield**

SAMPLOCATE:

PERMIT_NO: **77-67**

Facility Name: **Fresno-Clovis Regional Waste Water Facility #1**

Plant Type: **secondary**

CIUS: **18**
SIUS: **67**

Avg Flow MGD: **58.04**
% IUs Contribut: **15.0**
% Domestic: **85.0**

Disposal Type 1: **Stockpile**
Amount Disposed: **62000**
Units: **PPD**
In use since: **1982**

Disposal Type 2: **Land application**
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **YES**

LAB: **inhouse lab**

Other wastewtr?: **YES**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **NO**
Other septage?: **NO**

1st LEVEL: **Gravity or DAF thicl**

2nd LEVEL: **Anaerobic digestion**

3rd LEVEL: **Drying beds**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **Fresno**

Treats winery waste separately - has separate drying beds - but all sludge goes into same stockpile.

PERMIT_NO: **CA0037842**

Facility Name: **San Jose/Santa Clara Water Pollution Control Plant**

Plant Type: **tertiary**

CIUS: **205**
SIUS: **229**

Avg Flow MGD: **103.00**
% IUs Contribut: **15.0**
% Domestic: **85.0**

Disposal Type 1: **Stockpile**
Amount Disposed: **35800**
Units: **DT**
In use since: **1986**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **YES**

LAB: **inhouse**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **NO**
Other septage?: **NO**

1st LEVEL: **DAF thickened**

2nd LEVEL: **Anaerobic digestion**

3rd LEVEL: **Lagoons, drying beds**

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **San Jose**

Will begin using sludge for landfill cover, agricultural land application.

PERMIT_NO: **CA0080161**

Facility Name: **City of Taft Waste Water Treatment Facility**

Plant Type: **primary**

CIUS: **0**
SIUS: **0**

Avg Flow MGD: **0.80**
% IUs Contribut: **0.0**
% Domestic: **100.0**

Disposal Type 1: **Stockpile**
Amount Disposed: **9000**
Units: **CY**
In use since: **1983**

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **NO**

LAB: **Zalco Labs, Bakersfield**

Other wastewtr?: **NO**

Recv Septage?: **YES**
Domestic only?: **YES**
Grease?: **NO**
Other septage?: **NO**

1st LEVEL: **Aerated Lagoons**

2nd LEVEL: **Drying beds**

3rd LEVEL:

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **NO**

CITY NAME: **Taft**

SAMPLOCATE:

PERMIT_NO: **CA8000073**

Facility Name: **Carbon Canyon Water Reclamation Facility**

Plant Type: **tertiary**

CIUS: **7**
SIUS: **3**

Avg Flow MGD: **3.30**
% IUs Contribut: **5.0**
% Domestic: **95.0**

Disposal Type 1: **Goes to Reg Plant #2**
Amount Disposed:
Units:
In use since:

Disposal Type 2:
2-Amnt Disposed:
2-Units:
2-In use since:

Plan changes?: **NO**

LAB:

Other wastewtr?: **NO**

Recv Septage?: **NO**
Domestic only?: **N/A**
Grease?: **N/A**
Other septage?: **N/A**

1st LEVEL: **SEE RP#2 - COMBI**

2nd LEVEL:

3rd LEVEL:

Other sludges?: **NO**
Amt sludge recv:
3-Units:

Pretreatment Pr: **YES**

CITY NAME: **Chino Basin 2**

Sludge goes to Regional Plant #2 for treatment and disposal.